enviroparks

APPENDIX 11.1

Geo-environmental assessment,
Phase 2 Development

Part 3 of 4

APPENDIX C

SOIL MECHANICS SITE INVESTIGATION REPORT

Soil Mechanics

The UK's leading geotechnical specialists

Report No H8076

HIRWAUN INDUSTRIAL ESTATE DEVELOPMENT

INTERPRETATIVE REPORT ON SITE INVESTIGATION

Carried out for : Enviroparks Ltd

Engineer : Pell Frischmann

Date : January 2009

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1 INTRODUCTION

During August 2008 Soil Mechanics (SM) were commissioned by Pell Frischmann (PF), on behalf of Enviroparks Ltd (EL), to carry out a site investigation at Hirwaun Industrial Estate Development, Hirwaun. The investigation was required to obtain geotechnical and geoenvironmental information for a proposed Enviroparks waste recycling plant including anaerobic digestion and plasma conversion systems.

The scope of the investigation, which was specified by PF, comprised cable percussion and rotary drilled boreholes, trial pits, in situ testing and laboratory testing. The investigation was carried out in accordance with the contract specification and relevant standards (see References). The fieldwork was carried out between 14th August and 23rd September 2008.

This report presents the factual records of the fieldwork and laboratory testing together with an interpretation of the findings with respect to the proposed development. The data is also presented separately in digital format following AGS (2005).

A previous desk study report had been carried out by EL (dated November 2007). A copy of their report was made available to SM by PF at the outset of the current investigation. Previous investigations had been carried out by Wallace Evans, 1972 and Exploration Associates, 1995.

2 THE SITE AND GEOLOGY

2.1 The Site

Hirwaun Industrial Estate Development is situated approximately 1.5km northwest of Hirwaun Town Centre, see Site Location Plan in Enclosure F. The site is at National Grid reference SN 938 068.

The site comprised an area of approximately level ground that has been prepared as a development platform by regrading the site some 10 years ago. The site is approximately rectangular in shape and covers an area of approximately 8 Hectares and is approximately 250m to 300m at its widest. The site was locally flooded across the southern section of the site. No buildings were present on the site.

Evidence of existing drainage was visible with both herring bone type drainage and open ditches observed across the site.

The site boundary is defined by; a track at the lower edge of the Penderyn Reservoir embankment in the north, Ninth Avenue in the east, Fifth Avenue in the south and an unnamed stream in the west. The entrance to the site was established from the south boundary from Fifth Avenue.

The area surrounding the site is used for the Penderyn Reservoir and farm fields to the north, farm fields and woodland to the west and by industrial units in the south and east.

2.2 EL Desk Study

The desk study carried out by EL revealed that the site was formally used as an Ordnance factory during the Second World War although all buildings associated with the plant were demolished in the late 1960s early 1970s. The site remained vacant until the late 1990s when the Welsh Development Agency (WDA) re-profiled the site creating the plateau noted in the previous section.

The site was not thought to be particularly contaminated from the previous use as it is believed that natural materials were used to level the site.

2.3 Published Geology

The published geological map covering the site, GS Sheet 231 (1979) drift shows the surface of the site to be covered by alluvium over the south and glacial till to the north. The glacial till probably underlies the alluvium. Bedrock at the site comprises the Lower Coal Measures, a sequence of mainly mudstones and sandstones with rare coal seams. An unnamed coal seam is shown to outcrop with an east to west strike through the centre of the site. It is not part of the scope of this report to comment on any possible mining beneath the site.

The 1995 desk study includes a 1993 mining report which states that it is extremely unlikely that mining has been undertaken under the site in the past, or will be in the future. However, within this mining report it states that it is valid for a period of 12 months only, and therefore should be updated.

Two north south trending faults are located to the east and west of the site with downthrows to the west. The general dip of strata is to the south.

From the desk study previous investigations revealed alluvial deposits overlying glacial deposits with Lower Coal Measures bedrock found at approximately 10 m below ground level. The Alluvium was believed to have a layer of peat within it.

3 FIELDWORK

3.1 General

The fieldwork was carried out in general accordance with BS EN 1997-2 (2007) and its related standards together with the relevant section of BS 5930 (1999).

The exploratory hole locations were selected by PF. The locations were set out from local features. The co-ordinates and reduced levels were surveyed by Pelorus who surveyed final position to National Grid and Ordnance Datum. The exploratory hole locations are shown on the Site Plan in Enclosure F.

3.2 Exploratory Holes

The exploratory holes are listed in the following table.

SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	MAXIMUM DEPTH (m)	REMARKS
Cable Percussion Boring	9	10.90	Designated as BH101 to BH109
Rotary Core Drilling/Open Hole Drilling	5	18.00	Designated as BH101R, 103R, 105R, 107R and 108R
Trial Pits	19	3.80	Machine dug, designated as TP1, TP1A, TP2 to TP11, TP11A, TP12, TP12A, TP14 to TP17

The exploratory hole records are presented in Enclosure A and should be read in conjunction with the Key included therein. The records provide descriptions of the materials encountered, in accordance with the standards referenced on the Key, details of the samples taken, together with observations made during boring, drilling and pitting. Photographs of the trial pits and recovered cores are presented in Enclosure E.

On completion of the fieldwork all geotechnical samples were transported to the laboratory of Soil Mechanics for temporary retention and testing. Geoenvironmental samples were transported from site directly to the laboratory of TES Bretby for testing.

Plots of SPT 'N' value against depth and reduced level are presented in Enclosure F.

3.3 Instrumentation and Monitoring

The instruments installed in the exploratory holes are shown on the logs and detailed in Enclosure B. Records of groundwater and gas monitoring carried out by SM who monitored the installations after the fieldwork period are presented in Enclosure B.

4 LABORATORY TESTING

4.1 Geotechnical Testing

The testing was scheduled by SM and was carried out in accordance with BS 1377 (1990). The testing is summarised below and the results are presented in Enclosure D.

SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	REMARKS
Moisture Content Determination	16 no
Atterberg Limit Determination	11 no
Particle Size Distribution Analysis	14 no tests
pH and Water Soluble Sulphate Content of Soils	Testing appropriate for use with BRE Special Digest 1 (2005). 21 no tests
Unconsolidated Undrained Triaxial Compression Testing	1 no test
One Dimensional Oedometer Consolidation Testing	2 no tests
Compaction tests	2 no tests 2.5kg method and 2 no tests 4.5kg method

A plot of index properties against depth and a plasticity chart are presented in Enclosure F.

4.2 Geoenvironmental Testing

The testing was scheduled by SM and was carried out by TES Bretby at their Burton on Trent laboratory. The results are presented in Enclosure D.

Testing as required under the Landfill (England and Wales) Regulations 2002 (as amended) and current regulatory guidance (EA 2005) has not been instructed.

5 GROUND CONDITIONS AND GROUNDWATER

5.1 Strata Encountered

Descriptions of the strata encountered are given on the exploratory hole records. The downward succession encountered is broadly uniform across the site and is summarised below. Depths and reduced levels of the base of the Made Ground and depths and reduced levels of rockhead are presented on plans in Enclosure F.

TABLE : SUMMARY OF STRATA - ALL EXPLORATORY HOLES

Code	STRATA	Minimum thickness (m)	Maximum thickness (m)	Minimum level top of strata (m OD)	Maximum level top of strata (m OD)	Remarks
A	**MADE GROUND**	0.10	3.60	198.88	203.44	Base of layer 0.10 to 3.60 (m)
A1	MADE GROUND: Very dense brown clayey sandy angular to subangular fine to coarse GRAVEL of sandstone with low cobble content. Cobbles are angular to subangular of sandstone, locally of brick, concrete, fused slag, builder's waste etc. Locally a sand	0.10	3.50			Not BH 108 & 108A or TP12, 12A & 14
A2	MADE GROUND: Soft to stiff grey and black slightly sandy slightly gravelly silty CLAY or SILT with low to medium cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite locally of brick, concrete, builders waste etc	0.10	3.20			TP01A, 2 to 6, 8, 9, 11, 12A 14 and 15 only.
B	**ALLUVIUM (Old Topsoil Layer ?)**					
B1	Soft to firm brown and black clayey SILT with rare small pockets of back woody peat and many roots/rootlets	0.50	0.50			Trial Pit 6 only
C	**GLACIAL DEPOSITS**	3.52	8.50	195.67	200.68	Base of layer 0.50 to 11.70 (m)
C1	Dense to very dense locally medium dense brown and grey brown clayey silty subrounded to angular fine to coarse GRAVEL of sandstone with low to high cobble content. Locally gravelly COBBLES	8.50	0.20			All holes that proved the base of the Made Ground
C2	Firm to stiff grey slightly sandy slightly sandy silty CLAY with medium cobble content. Gravel is subrounded to subangular fine to coarse of sandstone and quartzite. Locally organic ? and soft and a silt.	0.30	3.40			BHs 102, 103 & 104 and TP01, 6, 7, 12A, 14, 15 & 16 only.
D	**WEATHERED BEDROCK**	0.10	3.60	187.54	194.07	Rockhead 8.50 to 12.00 (m)
D1	Fractured broken SANDSTONE with brown sandy silt (Driller's description)	0.20	5.40			BHs 101R, 103R, 105R, 107R and 108R only
E	**LOWER COAL MEASURES**	0.10	3.60	186.88	191.42	Rockhead 8.50 to 12.00 (m)

TABLE : SUMMARY OF STRATA - ALL EXPLORATORY HOLES

E1	Moderately strong to very strong grey stained brown SANDSTONE/SILTSTONE rare mudstone bands	0.60	6.30			BHs 101R, 103R, 105R, 107R and 108R only

The strata profile encountered across the site was relatively consistent with a layer of Made Ground typically up to 3.5 m thick overlying cohesive and/but predominantly granular glacial deposits. It is possible that adjacent to the southern border by the stream alluvium may be encountered although there was little evidence of this from the exploratory holes. Bedrock was encountered at a depth of between 8.5 to 12.0 m (186.9 to 191.4 mAOD).

5.2 Made Ground

Made Ground, 0.1 to 3.6 m thick but typically over 2.0 m thick, was encountered across the whole site. The material was proved down to a reduced level of 195.7m OD. A plan showing the thicknesses of the Made Ground and also the basal levels of the material are shown on a plan in Enclosure G.

The Made Ground was predominately granular but cohesive layers or pockets up to 3.2 m thick were found but typically less than 1.0 m thick.

The cohesive layers were predominantly of a soft to firm consistency. These soils should therefore be regarded as being of relatively low strength and possibly relatively compressible.

For the granular soils SPT N Values ranged from 14 to over 50 suggesting a medium dense to very dense relative density. It is possible however that the higher values are as a consequence of encountering coarse granular particles and therefore for design purposes the strata should be regarded as having a medium dense relative density. An internal angle of friction of approximately 32 to 34 degrees (Peck & Thornburn (1975)) would therefore be assessed. A bulk density for this stratum would be about 1.9 Mg/m^3.

5.3 Alluvium

Alluvium comprising soft to firm clayey silt with rare small pockets of back woody peat and many roots/rootlets was proved in Trial Pit 6 only. From previous investigations the extent of the alluvium (peat) would be greater than would be expected from this investigation. It is possible

however that the material was removed during the regrading exercise. The supposed extent of the alluvium (peat) is shown on the Exploratory Hole Location Plan in Enclosure F.

5.4 Glacial Deposits

5.4.1 General

Underlying the Made Ground both cohesive but predominantly granular glacial deposits were encountered and proved to a depth of 8.50 to 12.00 m (186.9 to 191.4 mAOD) where bedrock was encountered.

In assessing parameters in glacial deposits it is usual to use SPT ‘N’ values, assuming it has not been possible to recover undisturbed samples of sufficient quality for laboratory testing. However such soils often contain coarse granular materials where high SPT 'N' values are often recorded which are not necessarily representative of the true strength or in situ relative density of the soil. This is usually as a consequence of trying to drive a cobble or boulder in the ground requiring very high blow counts, to achieve any sort of penetration. It has been found therefore that when determining parameters from 'N' values for design purposes the lower bound or even the lowest values obtained are more representative of the true relative density than the mean values and on this basis suggested design lines are presented on the SPT 'N' value with depth/reduced level plots in Enclosure F. In this context the 'N' values assessed for design purposes would be about 5 at say 2 m at the top of the strata increasing incrementally to over 40 blows or locally greater at say 10 m depth.

5.4.2 Cohesive Glacial Deposits

Cohesive glacial deposits (Glacial Till) were found across the site in about half the exploratory holes with thicknesses ranging from 1.3 to 3.5 m but with typical thicknesses of 1.6 m.

The soils were essentially clays of low plasticity. Given the SPT N-values assessed for design purposes (see Section 5.4.1) then the clay bands had a consistency of soft to firm becoming stiff then very stiff with increasing depths. Based on published correlations (Stroud & Butler (1975)), the N-values suggest an undrained shear strength (c_u) of clay layers at depths of 2.0 m of approximately 30 kPa increasing incrementally to over 150 to 200 kPa at about 10 m and deeper.

Given the low plasticity of the soils, then a coefficient of volume compressibility (m_v) of approximately 0.4 m^2/MN (Stroud & Butler (1975)) at 2.0 m decreasing incrementally to about 0.05 m^2/MN at 10.00 m would be estimated. A bulk density for this stratum would be about 2.1 Mg/m^3.

5.4.3 Granular Glacial Deposits

The glacial granular deposits represent the predominant glacial deposit and was found across the site in the majority of the exploratory holes that proved the base of the Made Ground. In general an initial layer of this granular deposit was encountered above the cohesive glacial deposit (Glacial Till), which in turn overlay another thicker deposit of granular glacial material. SPT N-values for design purposes within this strata would be typically 5 at 2.0 m rising incrementally to 40 at 10.0 m suggesting a loose becoming medium dense then dense relative density. An internal angle of friction of approximately 28 to 30 degrees (Peck & Thornburn (1975)) at 2.0 m increasing incrementally to about 38 to 40 degrees at 10.0 m and deeper would therefore be assessed.

A bulk density for this stratum would be about 2.0 Mg/m^3.

5.5 Lower Coal Measures

Predominantly sandstone bedrock was encountered at a depth of between 8.5 to 12.0 m (186.9 to 191.4 mAOD) where proved by rotary coring. It is possible locally on the site rockhead may be found both deeper and shallower than those depths. A plot of depths to bedrock and reduced levels of rockhead are presented on a plan in Enclosure F.

The rock comprised a moderately strong to very strong sandstone/siltstone with rare mudstone bands but upper layers, up to 5.2 m thick, were recorded which were either highly weathered or fractured as no or little core could be recovered.

5.6 Groundwater

A summary of groundwater strikes encountered during boring, drilling and pitting are presented below and also a table of water levels recorded in the boreholes at the start of the shift.

TABLE : SUMMARY OF GROUNDWATER STRIKES

Hole	Depth of Water Strike (m)	Water depth after 20 mins (m)	Remarks/Observations
BH101R	6.00	5.90	slow
BH101R	10.00	7.30	fast
BH103	8.40	1.50	
BH103R	1.50	1.20	Medium
BH104	9.10		
BH105R	3.00	2.70	Medium
BH105R	8.10	0.80	Fast
BH107R	0.90	0.80	Fast
BH108R	0.90	0.80	Fast
TP2	2.40	2.40	Seepage
TP3	0.00	NA	Seepage from surface
TP5	0.00	NA	Seepage from surface
TP7	0.00	NA	Seepage from surface
TP8	0.00	NA	Strong inflow from surface
TP11	1.40	NA	Seepage
TP11A	1.40	NA	Strong inflow
TP12	1.70	NA	Seepage
TP12A	1.80	NA	Seepage
TP14	1.80	NA	Strong inflow
TP15	1.80	NA	Seepage
TP16	0.30	NA	Strong inflow
TP17	1.30	NA	Strong inflow

TABLE: START OF SHIFT WATER LEVELS

Hole	Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
BH101	4.50	3.50	1.60	Start of shift
BH101R	16.50	12.00	0.95	Start of shift
BH102	4.50	4.50	3.40	Start of shift
BH107R	11.00	8.50	0.80	Start of shift
BH108R	6.00	6.00	0.80	Start of shift

These observations however do not necessarily indicate the position of the water table as equilibrium conditions were not determined. It is possible therefore that a higher water table than suggested by the boreholes may be found during construction.

Groundwater depths recorded in standpipes after completion of fieldwork ranged from 0.10 m (Borehole 109) to 2.04 to 2.31 m (Boreholes 101 to 103 & 105) that is with water-table reduced levels varying from 196.8 to 199.8 mAOD. A plan showing the levels and depths to the groundwater is presented in Enclosure F. From this plan it appears the hydraulic gradient falls to the south.

It should be appreciated that part of the site was flooded suggesting, given the predominantly granular strata, a water table close to ground level at least locally. It will be appreciated that seasonal fluctuations in groundwater level will occur with the highest levels likely to be recorded towards the end of the winter and following extended periods of heavy rain. Other effects such as investigation and constructional excavation may also change groundwater levels.

6 PROPOSED WORKS

It is proposed to construct a waste recycling plant including anaerobic digestion and plasma conversion systems, a power station office block/visitors centre and other structures. Details of the plant were provide as a series of drawings referenced M53274, dated August 2008. The proposed loadings are presented below:

TABLE: PROPOSED STRUCTURAL LOADINGS

Fuel Preparation Area		Anaerobic Digestion Area		Plasma Gasification Process Area		Pryolsis Process Area		Biomax Process Area		Power House		Water Treatment Area		Visitor's centre
Structure	*Load*	*Structure*	*Load*	*Structure*	*Load*	*Structure*	*Load*	*Structure*	*Load*	*Structure*	*Load*	*Structure*	*Load*	
Dano drums	100 tonne rotating load	Inoculation Chamber	65 kN/m^2	Floor	65 kN/m^2	Floor	65 kN/m^2	Centrifuge	65 kN/m^2	Engines	6x60 tonne piles	Reactor	75kN/m^2	Two storey building with strip footings
Piles under dano drums	4 piles at 60tonnes each at each end	Day tanks	65 kN/m^2	Portal Frame	30 tonnes per column	Portal Frame	30 tonnes per column	Macerators	65 kN/m^2	Turbines	6x60 tonne piles			
Waste storage area	50 kN/m^2	Anaerobic Digesters	165 kN/m^2					Separators	65 kN/m^2	Portal frame	50 tonnes per column			
Macerators	50 kN/m^2	Driers	65 kN/m^2					Portal frame	30 tonnes per column					
Skip	50 kN/m^2	Ammonia Scrubber	65 kN/m^2											
Portal frame	60 tonnes per column	LPG	65 kN/m^2											

It is understood that many of the structures will be founded below or partly below ground level with founding levels down to 195.5 mAOD. These structures will therefore have full or partial basements.

7 GEOTECHNICAL ENGINEERING ASSESSMENT

7.1 Foundations

7.1.1 Introduction

The strata profile encountered across the site was relatively consistent with a layer of Made Ground typically 2.0 m thick (but locally up to 3.5 m thick) overlying cohesive and/but predominantly granular glacial deposits. There is evidence from previous investigations at the site (undertaken in 1995) to suggest that adjacent to the southern border by the stream alluvium may be encountered, however there was little conclusive evidence of this from the recently drilled exploratory holes. Bedrock was encountered at a depth of between 8.5 to 12.0 m (186.9 to 191.4 mAOD). Groundwater was found at virtually ground level to about 2.27 m (196.8 to 199.8 mAOD).

While the strata overall in terms of layer thicknesses is relatively consistent within each layer there is significant variation of the material. In this context bands of clay of apparently variable thickness are present in both the Made Ground and underlying Glacial Deposits although the soils overall are predominantly granular. Consequently it is very difficult to give definitive guidelines for foundations for a structure as a particular footing could be on a part of the site where clay predominates while its neighbouring footing is on predominantly granular soils. In this case the conditions exist for differential movement as each stratum has differing settlement/stiffness properties. It may be therefore advisable to consider piling all structures that are sensitive to ground movements. Such structures could include portal frame column bases, machinery foundations etc.

For light to moderate loads where some settlement may be acceptable shallow strip or pad foundation could be feasible but such decisions can only be made at the design stage when more details of the structures are available.

The following therefore presents options for the various foundation types with sufficient information to enable foundations to be designed. Given the complexity of the development and of the ground conditions it is likely that it will be necessary to do a foundation assessment on a structure by structure basis when full details are available.

7.1.2 Shallow foundations

It is anticipated that only a few of the structures would be founded on shallow foundations close to ground level. This would notably be the office/visitors centre in the south east corner of the site. However almost all such foundations would mean founding within the Made Ground. Consequently only the lightest structures should have such foundations. It is however possible that at the basement level shallow foundations could be used for the more lightly loaded structures where the foundations would be most likely on the glacial deposits.

The Made Ground based on the testing carried out has reasonable properties being predominantly granular. It is possible therefore that this material was laid in a controlled manner following an earthworks type specification. There is always however a risk be it slight in founding in such soils. Consequently strip footing should be suitably reinforced so they can span any weak ground or alternatively utilise a piled foundation.

For strip foundations to carry wall loads then foundations should be taken below any unsuitable materials to a minimum depth of say 0.75 m (assuming granular strata) where Made Ground (close to ground level) or natural glacial soils (at basement level) will be found. The natural glacial soils, immediately below the Made Ground based on SPTs have generally poorer properties than the Made Ground. In this context the Made Ground would be medium dense while the natural soils would only be loose (see plots of SPT 'N' value against depth).

Below are presented tables which give safe bearing pressures to enable sizing of pad foundations and/or strip footing widths to be derived once loads are known for both the Made Ground and the Glacial Deposits. These values have been derived assuming total settlement for a particular footing does not exceed 25 mm, which is the conventional maximum limiting criteria, for assessing allowable bearing pressures, for most structures.

SAFE BEARING PRESSURES TO LIMIT SETTLEMENT TO 25mm FOR SPREAD OR STRIP FOUNDATIONS FOUNDED WITHIN THE MADE GROUND

Minimum Founding depth (m) below existing ground level.	**Relative density**	**Safe bearing capacity (kPa) for foundations not exceeding the following widths**		
		Foundation width 1.00m	**Foundation width 2.00m**	**Foundation width 4.00m**
0.75 m	Medium Dense	150	100	Not anticipated

SAFE BEARING PRESSURES TO LIMIT SETTLEMENT TO 25mm FOR SPREAD OR STRIP FOUNDATIONS FOUNDED WITHIN THE GLACIAL DEPOSITS

Minimum Founding depth (m) below existing ground level.	Relative density	Safe bearing capacity (kPa) for foundations not exceeding the following widths		
		Foundation width 1.00m	Foundation width 2.00m	Foundation width 4.00m
Below the Made Ground and 0.75m into the material	loose	100 or 50 if close to the water table	75 or 40 if close to the water table	75 or 40 if close to the water table

Notes: Bearing pressures would have to be halved as indicated if at or close to the water table which is what would be expected.

Prior to construction of such foundations, the formation zone should be inspected by a suitably experienced person to confirm the founding conditions. It should be appreciated that soils can be variable and locally softened, and therefore the minimum relative density given above are for guidance to enable an inspector to satisfy himself that at the founding level the strata is suitable.

All soft or loose soils encountered at the formation level should be removed and replaced with compacted engineering fill or lean mix concrete. Upon excavation and following inspection, the formation zone should be immediately concreted or protected by a layer of blinding to prevent softening, especially in the presence of groundwater, of the exposed soils. In this context the soils being sandy are particularly prone to these effects. Comments regarding the groundwater are presented in Section 5.6.

7.1.3 Piles

It is anticipated that the majority of the structures will be piled.

It should be appreciated that the load bearing characteristics of piles are very dependent on the type of pile, method of installation and construction, and workmanship and as such it is recommended that detailed discussions be held with suitably experienced piling contractors prior to finalising design. In any event positive assurances should be sought from the piling contractor in respect of performance of their proprietary system.

For the design of piles, both a driven or bored concrete cast in situ pile could be considered. From the boreholes pile lengths of say 10 to 15 m would be anticipated with piles founded in bedrock. A driven pile may not be acceptable given the environmental hazards (noise and vibration) that results from such methods. In addition such piles may prove difficult to pile to depth due to the coarse nature of the ground.

It is assumed that piles will terminate within bedrock. In this case the maximum working load would be defined by the working compressive strength of the concrete (normally taken as 25%) used to form the pile shaft and for a 450 mm diameter bored pile would equate to a vertical working load of about 1000 to 1200 kN. It is probably advisable however to use lower pile loads for preliminary design purposes (say 50 to 75% of maximum) until the values can be verified by pile testing.

Given the thickness of Made Ground it may be necessary to consider incorporating in the design of the piles some small allowance for negative skin friction if it is perceived that the material is likely to settle.

For pile groups then the above pile load would need to be reduced to keep settlement within tolerable bounds. Final pile design should be confirmed with pile load tests carried out on working piles taken to 1.5 times its design working load or preferably on piles specifically put down for pile testing where higher loads can be applied. Pile integrity tests should also be carried out on a selection of the piles.

7.1.4 Basements/Ground Floor Slabs

For small presumably lightly loaded structures such as the visitors centre then given the thickness of the Made Ground then a suspended floor slab would be recommended although it may be possible to excavate and re-compact the upper layers of the Made Ground and use a ground bearing slab suitably reinforced.

Many of the ground floor slabs will be below ground level, and therefore, will effectively be basements. Whether these can be designed as ground bearing or have to be piled, will depend on the net loadings. If the loadings are similar to the effective overburden pressure removed, then ground bearing slabs may be feasible. If loads are particularly high then a piled slab may be advisable. This however can only be assessed on a structure by structure basis.

It should be noted that many of the bases will be below the water table and consequently the ground may become disturbed during construction. This disturbance would need to be taken into account when designing foundations. It may also be necessary to consider buoyancy effects given the high water table for certain structures.

It will be necessary to remove all unsuitable materials from beneath the proposed slab location and replace with suitable imported granular fill. Prior to placing the fill the formation should be proof

rolled and inspected such that any soft spots that develop can be removed and replaced with compacted suitable granular infill. It should be appreciated that the likely formation soil here are sandy and will soften rapidly especially where water is present. In this context it would be recommended that the formation is protected as soon as is feasible following excavation.

7.3 Excavations and Groundwater

Any excavations required within the strata observed should be easily accomplished using conventional back-acting hydraulic plant. However excavations may require support even at shallow depths. Any excavation requiring man entry should be fully supported or cut back to a safe slope in accordance with normal safe site practice.

Localised seepages into open trenches at/or above founding depths should be anticipated but should be capable of being controlled through pumping from internal sumps at shallow depths. At depths probably as shallow as 2.5 m (possibly shallower where the site is flooded) the inflows into any excavation may be more significant and consequently additional pumping and or other dewatering may be required. In this context permeabilities based on an assessment of the particle size distribution curves could be as high as 5×10^{-3} m/sec. It should be noted that with layered soils, as is the case here with water bearing granular layers sandwiched between cohesive layers, that there is the possibility for local blowing of excavations to occur.

7.4 Infrastructure

For preliminary design of roads and hard-standings a CBR of 2% can be used for a preliminary assessment but such values should be confirmed during construction by in situ CBR testing. It may be possible to use higher values where the soils are granular. The precautions to be taken with regard to the formation should be as discussed under Section 7.1.4 for the floor slabs.

7.5 Chemical Considerations for Buried Concrete

The results of twenty one tests for sulphate concentration and pH levels on selected soil samples measured sulphate concentrations of 0.01 to 0.26 grams per litre (as SO_4) and pH levels of 4.9 and 8.9. From these results characteristic values of 0.12 grams per litre for sulphate and pH level of 5.2 would be assessed.

These test results indicate a Design Sulphate Class 1 (DS-1) and Aggressive Chemical Environment for Concrete Class 3z (AC-3z) (BRE Special Digest 1 (2005)) assuming a brownfield site and a mobile groundwater regime.

8 GEOENVIRONMENTAL ASSESSMENT

8.1 Basis of Assessment

In line with existing legislation and the current regime for contaminated land, the site has been assessed using a risk based approach. To undertake this assessment it is necessary to define a conceptual model for the site which identifies the potential sources of contamination, the receptors and the pathways that can connect them. In order for there to be a risk from contamination, there must first be a source, a receptor (an entity which might be affected by the contamination) and a pathway (or mechanism) by which the receptor can be exposed to the contaminant.

Potential sources of contamination are usually associated with current and historical industrial activities, where the processing, storage, use, transportation and disposal of raw materials, products and wastes often leads to the contamination of underlying ground and groundwater. In addition, natural processes can also give rise to contamination such as hazardous gases.

Potential pathways can include dermal contact with or ingestion / inhalation of contaminated soil, permeable ground conditions, underground voids, services, groundwater flow and abstraction and surface water (flow and abstraction).

Potential receptors can include humans, environmental receptors (watercourses, groundwater and protected sites) and buildings or structures.

8.2 Potential Site Sources of Contamination, Pathways and Receptors

As discussed in Section 6, it is proposed to use the site for a new commercial development. Therefore there is the potential for receptors to be affected by any soil contamination via pathways created during and after the development.

Potential receptors relevant for the site are:

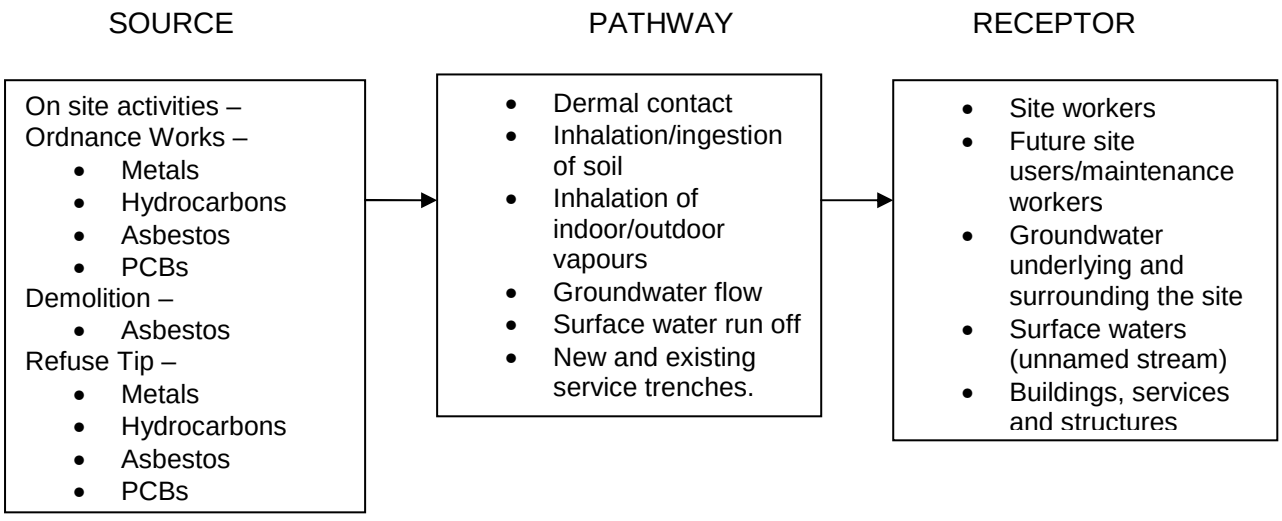
- Site workers during future development

- Future site users and maintenance workers
- Groundwater underlying the site
- A surface watercourse (unnamed stream) along the west boundary of the site.

Potential pathways by which the identified human receptors could be exposed to soil contamination include dermal contact and inhalation and ingestion of soil particles. In the case of the groundwater receptor, a potential pathway exists whereby rainfall could leach out soil contaminants into the groundwater. Contaminants could migrate via groundwater flow to the adjacent watercourse.

The desk study information presented in the report prepared by EL (dated November 2007) on past uses of the site indicates the north east section of the site had been developed previously into an ordnance works and, associated with these works, an area designated as a refuse tip. No details of the contents of the tip are available. The works were demolished in 1978 and no further buildings or works have been constructed on the site. The site was regraded and drainage placed across the site in 1999. The site is currently unoccupied. Potential contaminants could include metals, hydrocarbons, asbestos and polychlorinated biphenyls (PCB) in the area of the former ordnance works and the refuse tip.

The conceptual model is summarised below:



8.3 Soil Contaminants

In order to assess whether there is a source of soil contamination, 53 samples were analysed for pH, metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), sulphate, sulphur, sulphide, total moisture, phenols, cyanide (total and free) chloride and fraction of organic carbon (FOC). Selected samples were also analysed for PCB and screened for asbestos. The chemical analysis results are summarised in the table below.

SUMMARY OF CHEMICAL ANALYSIS RESULTS FOR SOILS FROM GL TO 1.0 m

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		SOIL GUIDELINE VALUE (SGV) *	NUMBER EXCEEDING SGV
		MIN.	MAX.		
Arsenic	30	4.9	13.9	500	0
Cadmium	30	<0.1	2.01	1400	0
Chromium (total)	30	7.7	44.3	5000	0
Chromium (hexavalent)	30	<0.1	<0.1	5000	0
Lead	30	8.2	187.2	750	0
Mercury	30	<0.1	0.22	480	0
Nickel	30	<0.5	28.2	5000	0
Selenium	30	<0.5	370.6	8000	0
Phenol	30	<0.5	<0.6	21900	0
Toluene	30	<0.011	<0.032	150	0
Ethylbenzene	30	<0.011	<0.032	48000	0

Notes : *based on end use of commercial/industrial
Units in mg/kg

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		SOIL SCREENING LEVEL (SSL) *	NUMBER EXCEEDING SSL
		MIN.	MAX.		
Copper	30	8.2	187.2	45700	0
Zinc	30	<1	212.4	188000	0
Boron (water soluble)	30	<0.5	420	314000	0
PAH (total)	30	<10	123	N/A	N/R
TPH	30	<11.0	1000	N/A	N/R
TPH (>C8 – C10)	30	<2	<3	N/A	N/R
TPH (>C10 – C12)	30	<2	<3	N/A	N/R
TPH (>C12 – C16)	30	<2	17.6	N/A	N/R
TPH (>C16 – C21)	30	<2	148	N/A	N/R
TPH (>C16 – C21)	30	<4.84	727	N/A	N/R
Cyanide (free)	30	<0.5	<0.6	11800	0
Cyanide (total)	30	<0.5	<0.6	11800	0
Sulphur	30	<19	306	N/C	N/R
Sulphate (acid soluble)	30	<19	1740	N/C	N/R
pH (unitless)	30	7.3	10.1	N/R	N/R
Thiocyanate	30	<2.2	<2.5	N/A	N/R

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		SOIL SCREENING LEVEL (SSL) *	NUMBER EXCEEDING SSL
		MIN.	MAX.		
Sulphide	30	<0.6	<0.6	N/C	N/R
PCB	4	<5.0	<5.2	14.7	0
FOC	30	0.25	3.16	N/C	N/R
Chloride	30	7.2	102	N/C	N/R
Barium	30	<0.1	420	31000	0
Boron	30	<0.5	3.4	314000	0
Antimony	30	<0.5	1.4	N/A	N/R
Molybdenum	30	<0.5	4.2	N/A	N/R
Xylenes	30	<0.023	<0.063	324	0
Benzene	30	<0.011	<0.032	1.65	0
Total Moisture	30	7.3%	21.5%	N/C	N/R

Notes : *based on end use of commercial/industrial
Units : mg/kg unless stated otherwise
N/A = Not available N/R = Not relevant N/C = Not considered hazardous to human health

SUMMARY OF CHEMICAL ANALYSIS RESULTS FOR SOILS FROM BELOW 1.0 m

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		SOIL GUIDELINE VALUE (SGV) *	NUMBER EXCEEDING SGV
		MIN.	MAX.		
Arsenic	23	2.3	27.8	500	0
Cadmium	23	<0.1	0.77	1400	0
Chromium (total)	23	7.9	19.6	5000	0
Chromium (hexavalent)	23	<0.1	<0.1	5000	0
Lead	23	9	39.2	750	0
Mercury	23	<0.1	0.94	480	0
Nickel	23	5.1	25.4	5000	0
Selenium	23	<0.5	1.1	8000	0
Phenol	23	<0.6	<0.9	21900	0
Toluene	23	<0.011	<0.290	150	0
Ethylbenzene	23	<0.011	<0.290	48000	0

Notes : *based on end use of commercial/industrial
Units in mg/kg

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		SOIL SCREENING LEVEL (SSL) *	NUMBER EXCEEDING SSL
		MIN.	MAX.		
Copper	23	4.2	27	45700	0
Zinc	23	18.7	203.1	188000	0
Boron (water soluble)	23	<0.5	4.1	314000	0
PAH (total)	23	<10	227	N/A	N/R
TPH	23	<11	611	N/A	N/R
TPH (>C8 – C10)	23	<2	4.73	N/A	N/R
TPH (>C10 – C12)	23	<2	29.9	N/A	N/R
TPH (>C12 – C16)	23	<2	198	N/A	N/R
TPH (>C16 – C21)	23	<2	223	N/A	N/R
TPH (>C16 – C21)	23	<4.85	226	N/A	N/R

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		SOIL SCREENING LEVEL (SSL) *	NUMBER EXCEEDING SSL
		MIN.	MAX.		
Cyanide (free)	23	<0.5	<0.9	11800	0
Cyanide (total)	23	<0.5	<0.9	11800	0
Sulphur	23	<19	968	N/C	N/R
Sulphate (acid soluble)	23	<21	2310	N/C	N/R
pH (unitless)	23	5.8	11.5	N/R	N/R
Thiocyanate	23	<2.2	<3.7	N/A	N/R
Sulphide	23	<0.5	15.6	N/C	N/R
PCB	1	<4.9	<4.9	14.7	0
FOC	23	0.16	5.08	N/C	N/R
Chloride	23	9.2	101	N/C	N/R
Barium	23	3	611	31000	0
Boron	23	<0.5	4.1	314000	0
Antimony	23	<0.5	1.7	N/A	N/R
Molybdenum	23	<0.5	5.3	N/A	N/R
Xylenes	23	<0.022	<0.581	324	0
Benzene	23	<0.011	<0.290	1.65	0
Total Moisture	23	8.9%	45.5%	N/C	N/R

Notes : *based on end use of commercial/industrial
Units : mg/kg unless stated otherwise
N/A = Not available N/R = Not relevant N/C = Not considered hazardous to human health

Within the United Kingdom the risks posed to human health by soil contaminants are assessed using a number of methodologies. One of these methods is the Contaminated Land Exposure Assessment (CLEA) model. Several versions of the model have been published (DEFRA and EA, 2002a, 2002b and 2002c and EA, 2005b). The 2002 version of model was used by the Environment Agency (EA) to derive Soil Guideline Values (SGVs) for a number of contaminants (DEFRA and EA, 2002d, 2004a, 2004b and 2005). The 2005 version of the model (beta version software) was used by Land Quality Management (LQM, 2007) and by SM to derive Soil Screening Levels (SSLs) for some additional contaminants. The derived SGVs/SSLs are for various site uses.

- Residential with gardens in which plants are grown for human consumption
- Residential with gardens but without plant uptake
- Allotments
- Commercial/industrial use where there are open areas which are not hard surfaced.

Following publication of a new version of the CLEA model in August 2008 (EA, 2008a, 2008b and 2008c), the SGVs derived by the EA and the 2005 version of the model used to derive SSLs have been withdrawn. However, no practical guidance has been provided by the EA as to how to

assess soil contamination in the absence of guideline values/screening levels. Therefore, for the purposes of the current report the previous SGVs and SSLs have been used pending new values being published by the EA or derived from the new software. However, it should be noted that if the new values are higher or lower than the existing values, re-assessment of the contamination may be required.

The SGVs/SSLs represent intervention values which act as indicators to an assessor that soil concentrations above this level might present an unacceptable risk to the health of site users and that further investigation and/or remediation is required. Given the proposed use of the site discussed in Section 8.2, the results in the above tables have been compared with a site use of commercial/industrial.

Where a CLEA SGV is not available for a particular contaminant, a Soil Screening Level (SSL) for commercial/industrial site use derived using the CLEA UK (beta version) software by Land Quality Management (LQM, 2007) or by Soil Mechanics has been utilised.

The chemical analysis results detailed in the above table show that the concentrations of the contaminants which have SGVs or SSLs did not exceed their respective guideline values. Therefore, these contaminants are not considered to pose a risk to site users.

No SGV or SSL is currently available for total PAH or TPH concentrations. However, SSLs have been derived for individual PAH. The most harmful PAH is considered to be benzo(a)pyrene and the SSL for commercial use is 29.7 mg/kg. Benzo(a)pyrene typically comprises 1% of the total (ERL, 1988). As the maximum PAH concentration in soil samples was 227 mg/kg, it is unlikely there will be a risk from benzo(a)pyrene or other PAH contamination to site users.

A range of TPH concentrations (maximum 1000 mg/kg) were encountered in soil samples across the site. Soil samples from trial pit TP2 had TPH concentrations in excess of the limit value for mineral oil (500 mg/kg) in the Landfill Waste Acceptance Criteria (DEFRA, 2004) below which waste including waste soil is considered to be inert. TPH concentrations are therefore considered to pose a potential risk to site users in the vicinity of TP2. However, carbon banding indicates that none of the SSLs for the aromatic and aliphatic fractions of the carbon bands were exceeded. Therefore, no actual risk is considered to be present.

The concentrations of copper, nickel and zinc encountered in soil samples are not considered to be high enough to inhibit plant growth (DE, 1989) in any landscaped areas.

The levels of phenol indicate that there would be no adverse effect on buried plastics (ERL, 1988 and WRAS, 2002) across the site. Hydrocarbon (PAH, TPH) concentrations indicate there would be no adverse impact on plastic water pipes (WRAS, 2002) across the majority of the site. A potential risk is present in the vicinity of TP2, TP10, TP11, TP12A, TP14, TP15, TP16, BH101, BH105 and BH109 where the guidance value of 50 mg/kg is exceeded.

No bulk asbestos fibres were observed in any of the samples screened for asbestos.

8.5 Groundwater Contaminants

A total of 5 groundwater samples were collected from boreholes standpipes during the investigation and analysed for metals, phenol, cyanide (free and total), sulphide, total sulphate, thiocyanate, pH, TPH, speciated PAH, chloride, fluoride, molybdenum, antimony, ammoniacal nitrogen, chemical oxygen demand (COD), biological oxygen demand (BOD), total organic carbon (TOC) and BETX (benzene, toluene, ethylbenzene and xylenes). The analysis results are summarised in the table below. The groundwater contamination has been assessed by reference to Environmental Quality Standards (EQS) and Environmental Assessment Levels (EAL) for inland waters published by the various Environment Agencies (EA, 2003a) and the Maximum Admissible Concentrations (MAC) presented in the Water Supply (Water Quality) Regulations (DETR 2000).

SUMMARY OF CHEMICAL ANALYSIS RESULTS FOR GROUNDWATER

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		EQS	EAL	MAC
		MIN.	MAX.			
Arsenic	5	<1	14	50		10
Cadmium	5	<0.1	0.3	5		5
Chromium	5	2	5		5-50*	50
Lead	5	<1	3		4-20*	25
Mercury	5	<0.1	0.1	1		1
Nickel	5	2	15		50-200*	20
Selenium	5	<1	4		N/L	10
Copper	5	<1	6		1-28*	2000
Zinc	5	19	95		8-125*	5000
Boron	5	30	80		2000	1000
Phenol	5	<50	<50		30	0.5
Cyanide (free)	5	<20	<20		1	50
Cyanide (total)	5	<20	<20		N/L	N/L
Sulphide	5	<200	1500		0.25**	
Total sulphate as SO4	5	11mg/l	32mg/l		N/L	250mg/l
Thiocyanate	5	<200	<200		N/L	N/L
pH (unitless)	5	6.6	7.5		6-9	6.5-10

DETERMINAND	NUMBER OF ANALYSES	MEASURED CONCENTRATIONS		EQS	EAL	MAC
		MIN.	MAX.			
TPH	5	<10	140			10
Naphthalene	5	0.010	1.219	10		
Acenaphthylene	5	<0.010	0.021	N/L	N/L	N/L
Acenaphthene	5	<0.010	0.755	N/L	N/L	N/L
Fluorene	5	<0.010	0.478	N/L	N/L	N/L
Phenanthrene	5	<0.010	0.104	N/L	N/L	N/L
Anthracene	5	<0.010	0.365	N/L	N/L	N/L
Fluoranthene	5	<0.010	0.327	N/L	N/L	N/L
Pyrene	5	<0.010	0.204	N/L	N/L	N/L
Benzo(a)anthracene	5	<0.010	0.032	N/L	N/L	N/L
Chrysene	5	<0.010	0.032	N/L	N/L	N/L
Benzo(b)fluoranthene	5	<0.010	0.020			0.025***
Benzo(k)fluoranthene	5	<0.010	0.024			0.025***
Benzo(a)pyrene	5	<0.010	0.021			0.01
Indeno(123-cd)pyrene	5	<0.010	0.010			0.025***
Dibenzo(ah)anthracene	5	<0.010	<0.010	N/L	N/L	N/L
Benzo(ghi)perylene	5	<0.010	<0.010			0.025***
Chloride	5	7mg/l	27mg/l	N/L	N/L	200mg/l
Fluoride	5	0.2mg/l	4.2mg/l	N/L	N/L	1.5mg/l
Molybdenum	5	<1	4	N/L	N/L	N/L
Antimony	5	<1	<1	N/L	N/L	5
Ammoniacal Nitrogen	5	190	11500	N/L	31	500
Chromium (hexavalent)	5	<10	<10	N/L	5-50*	50
COD	5	10000	80000	N/L	N/L	N/L
Total Organic Carbon	5	4000	24000	N/L	N/L	N/L
Barium	5	180	300	N/L	N/L	N/L
BOD	5	<2000	13000	N/L	N/L	N/L
Benzene	5	<5	9	30		
Xylene	5	<10	<10	30		
Toluene	5	<5	<5	50		
Ethylbenzene	5	<5	<5		20	

Notes :
Units : ug/l unless stated otherwise
* The EAL varies with water hardness (mg/l CaCO3)
** As hydrogen sulphide
*** 25% of sum of concentrations of benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(123-cd) and benzo(ghi)perylene
N/L = not listed

Comparison of the analysis results with the guideline values indicates the groundwater underlying the site is relatively uncontaminated. Many of the analysis results are below the level of detection. It is considered that the majority of the contaminant concentrations in the groundwater do not pose a risk to human health, to groundwater outside the site or to controlled surface waters.

However, there is a risk from benzo(a)pyrene contamination in the vicinity of BH101 and TPH contamination in the vicinity of BH101, BH103, BH105 and BH109.

There is a potential risk posed by elevated levels of copper and zinc. However, the actual risk will be dependant on the water hardness. There is also a potential risk from phenol and cyanide contamination. It should be noted that the guidance values for these contaminants are only exceeded as the limit of detection of the analytical method exceeds the guidance value.

8.6 Site Conceptual Model

In Section 8.2 potential sources of contamination, pathways and receptors were identified for the site based on the available information. These potential pollutant linkages constituted the preliminary conceptual model for the site.

The results of the site investigation have been used to refine the conceptual model and to define the specific source-pathway-receptor pollutant linkages for the site based on the proposed development.

The chemical analysis results in Section 8.3 indicate that there are limited sources of soil contamination at the site and therefore limited source-pathway-receptor pollutant linkages. These relate to risks to groundwater from metallic and hydrocarbon contamination and risks to pipes from hydrocarbon contamination.

8.7 Remediation/Recommendations

The levels of contamination in the analysed soil and groundwater samples are low for the analysed contaminants. Based on the available evidence, the site may be developed without the need for remediation to remove the risks to human health.

It is understood that the majority of the site will be covered by hardstanding on completion of the development. However, there will be landscaping in some areas of the site and a series of ponds in the southern section of the site. Therefore some remediation will be required to remove risks to controlled waters from hydrocarbon contamination. It is recommended that the ground in the vicinity of TP2 is excavated and removed to a suitably licensed disposal facility. A considerable depth of excavation (up to 3.50m below ground level) will be required to remove the risk to

controlled waters and it is recommended that the Environment Agency is consulted about the extent of the remediation.

Further site investigation and chemical analysis is recommended to delineate the TPH contamination in the vicinity of TP2 in order to reduce disposal costs.

Elevated levels of TPH and PAH in some areas of the site have the potential to affect plastic pipes. Where these are being proposed, it is recommended that the ground excavated for the service trenches is disposed of at a suitable licensed landfill facility. Following excavation samples should be taken for chemical analysis in order to confirm the in-situ ground is free from contamination. Should hydrocarbon contamination still be present, the trenches should be lined with an impermeable membrane. The trenches should be backfilled with uncontaminated materials.

Due to the limited nature of all site investigations, there always remains the possibility that pockets of previously undiscovered contamination may be encountered during redevelopment. If any unusual or fibrous materials or signs of contamination spillages are found during the works the area should be fenced off and advice sought on the nature of the possible contamination.

8.8 Construction Health and Safety

Based on the chemical analysis results, the levels of the majority of contaminants in the soil at the site are such that they do not pose a particular hazard to ground workers. However, it is considered that TPH contamination could pose a risk to ground workers in the area of TP2.

Contact with soil should be avoided and standard site hygiene procedures should be implemented, such as wearing gloves and overalls and providing adequate washing facilities. Eating, drinking and smoking should be banned in the working areas to prevent inadvertent ingestion of the soil.

8.9 Disposal of Excavated Materials

The chemical analysis results in Section 8.3 indicate that the majority of excavated materials may be disposed of as non-hazardous waste (EA, 2004 and 2006). It may be possible to dispose of excavated materials characterised as non-hazardous waste with TPH concentrations less than 500mg/kg as inert waste. However, this will require WAC (Waste Acceptance Criteria) testing of the waste to prove it conforms to the definition of inert waste as set out in the Landfill Regulations (DEFRA, 2002, 2004 and 2005).

Soils with concentrations of TPH equal to or greater than 1000 mg/kg but less than 10000 mg/kg are potentially hazardous waste. The current classification system (EA, 2007) is based on the total concentration of eight known carcinogenic PAH in the same sample. If the total exceeds 1% of the TPH concentration then the material is hazardous waste.

A sample for TP2 had a TPH concentration of 1000 mg/kg and a total PAH concentration of <10 mg/kg. Although the total concentration of the 8 PAH has not been determined, clearly the threshold (10 mg/kg) can not be exceeded. Therefore, hazardous waste disposal will not be required for excavated materials in the vicinity of TP2.

9 GAS

Ground gas is largely generated by the decomposition of organic matter, both in natural soils such as peat, and man made deposits such as landfill or other fill materials. The gases that are normally associated with these materials, and which can pose a risk to health, include methane (which is toxic and also potentially explosive), and carbon dioxide (which is toxic). Oxygen depletion is also a consequence of the generation of these other gases.

For the assessment of sites, in terms of the potential for ground gas to present a hazard, the risk-based methodology detailed in CIRIA Report C659 (2007) is used. The above is primarily based on the main method of characterising a site as proposed by Wilson and Card (1999). This method can be used for all types of development except conventional low-rise housing and therefore is appropriate for the proposed industrial development. The method is predominantly centred on a conceptual model which relates possible sources of gas to likely receptors via potential pathways.

The potential risk associated with gases being generated in the ground (whether from natural or man made sources) depends on the concentrations of gas and its rate of flow to the surface. These factors are assessed by monitoring of the gas installations in the boreholes. The variable nature of gas generation, and the effect of barometric pressure on gas flow, means that the volume of gas potentially reaching the ground surface is normally inconsistent over time. It is therefore necessary to undertake a number of monitoring visits over as long a period as is practical (and preferably with varying atmospheric pressure conditions), to establish the full range of gas conditions at the site.

Gas monitoring to date has recorded levels of methane up to 1.2% by volume in air while levels of carbon dioxide levels were up to 4.3 % by volume in air. No hydrogen sulphide was encountered. Oxygen levels ranged from 15.4 to 20.8%. The maximum flow rate recorded was 0.4 litre per hour. The readings were taken with atmospheric pressures ranging from 978 to 1013 mb.

The gas screening value is defined as a product of the gas concentration and gas flow, the worst case scenario being established from the highest of each. The highest measured borehole flow rate was 0.4 l/hr and the highest concentration of methane or carbon dioxide was 4.3%. The gas screening value would therefore be 0.02 l/hr, which is within the range for Characteristic Situation 1 (CIRIA R149 (2007)). This is regarded as 'Very Low Risk', and is normally associated with natural organic soils and 'typical made ground'. For the Characteristic Situation 1 no special precautions would normally need to be adopted but as methane levels are over 1 % it may be advisable to carry out a assessment of those parts of the development that may be at risk (eg small enclosed spaces in contact with the ground) of gas accumulation and adopt Characteristic Situation 2 requirements (CIRIA R149 (2007)) where appropriate.

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WRAS : 2002 : The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land. Water Regulations Advisory Scheme, Report No 9-04-03, 2002.

DEFRA : 2002 : The Landfill (England and Wales) Regulations 2002.

DEFRA : 2004 : The Landfill (England and Wales) (Amendment) Regulations 2004.

DEFRA : 2005 : The Landfill (England and Wales) (Amendment) Regulations 2005.

DETR : 2000 : The Water Supply (Water Quality) Regulations 2000.

EA : 2004 : Framework for the Classification of Contaminated Soils as Hazardous Waste. Environment Agency, Version 1, July 2004.

EA : 2005 : Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance Criteria. Environment Agency, Version 1, April 2005.

EA : 2006 : Technical Guidance WM2 Hazardous Waste – Interpretation of the Definition and Classification of Hazardous Waste, Second Edition, Version 2.1. Environment Agency, Scottish Environment Protection Agency and the Northern Ireland Environment and Heritage Service, October 2006.

EA : 2007 : HWR08 – How to find out if waste oil and wastes that contain oil are hazardous. Environment Agency, Version 3.1, June 2007.

EA : 2008a : CLEA Software version 1.03 Beta. Environment Agency, August 2008

EA : 2008b : Updated Technical Background to the CLEA Model, Science Report SC050021/SR3. Environment Agency, August 2008

EA : 2008c : Human Health Toxicological Assessment of Contaminants in Soil, Science Report SC050021/SR2. Environment Agency, August 2008

ENCLOSURE A
EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
Borehole Logs	BH101 to 109R
Trial Pit Logs	TP1 to 17

Key to Exploratory Hole Records

Soil Mechanics

SAMPLES

Undisturbed

U	Driven tube sample
TW	Pushed thin wall tube sample } nominally 100 mm diameter and full recovery unless otherwise stated
P	Pushed piston sample
L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated
CBR	CBR mould sample
BLK	Block sample
CS	Core sample (from rotary core) taken for laboratory testing
AMAL	Amalgamated sample

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample
	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C — Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3 (2005). The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 (either in total or for a single increment) the total blow count beyond the seating drive is given (without the N = prefix).

IV	*in situ* Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Variable head permeability tests (KFH = falling head test, KRH = rising head test, KPI = packer test), permeability value
	Test results provided in Field Records column

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930 (1999)

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Key to Exploratory Hole Records

Soil Mechanics

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

SP Standpipe
SPIE Standpipe piezometer
PPIE Pneumatic piezometer
EPIE Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:

ICE Biaxial inclinometer
ICM Inclinometer tubing for use with probe
SLIP Slip indicator

Settlement Points or Pressure Cells

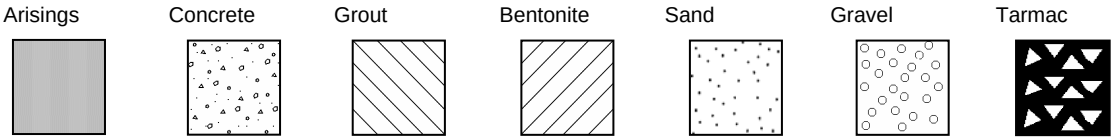
The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column:

ESET Electronic settlement cell/gauge
ETM Magnetic extensometer settlement point
EPCE Electronic embedment pressure cell
PPCE Electronic push in pressure cell

INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends additional to BS5930 are used to describe the backfill materials as indicated below.



NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1 (2002), 14688-2 (2004), 14689-1 (2003) and BS 5930 (1999) as clarified by Baldwin et al (2007).

2 Strata legends are in accordance with BS 5930 (1999).

3 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole (ref BS5930 : 1999, Clause 47.2.7). In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.

4 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.

5 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

6 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.

7 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures

Key to Exploratory Hole Records

Soil Mechanics

REFERENCES

Baldwin M, Gosling R C and Brownlie N : 2007 : Soil and rock descriptions - a practical guide to the implementation of BS EN ISO 14688 and 14689. Ground Engineering, July.

BS EN ISO 14688-1 : 2002 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2 : 2004 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 22476-3 : 2005 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

BS 5930 : 1999 : Code of Practice for site investigations. British Standards Institution

Updated July 2007

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 27/08/2008 **End** 28/08/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion methods 1.20 - 5.60m.	**Depth from** 0.00m	**to** 5.60m	**Diameter** 200mm	**Casing Depth** 5.60m	**Ground Level** +199.24 mOD **Coordinates** E 293941.51 **National Grid** N 206685.12 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			27/08/2008	0800 dry
0.30	ES 1			
0.70	ES 2			
1.20-1.47	SPT C	50 (4,10/10,40 for 40mm)	1.20	dry
1.20-1.65	B 3			
1.50	ES 4			
2.00-2.45	SPT C	N=36 (10,6/9,9,9,9)	2.00	1.50
2.00	B 5			
2.50	ES 6			
3.00-3.45	SPT C	N=25 (10,11/10,4,6,5)	3.00	1.60
3.00-3.45	B 7			
			27/08/2008	1700
			3.50	1.60
3.50	ES 8			
4.00-4.45	SPT C	N=30 (6,6/10,7,6,7)	4.00	1.60
4.00-4.45	B 9			
4.50	ES 10			
			28/08/2008	0800
			3.50	1.60
5.00-5.45	SPT C	N=25 (4,5/5,6,7,7)	5.00	1.60
5.00	B 11			
			28/08/2008	1700
5.50-5.81	SPT C	50 (10,10/12,20,18 for 10mm)	5.50	1.60
5.60-5.91	SPT C	30 (25,20/20,10, for 10mm)	5.60	1.60

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND: Very dense brown clayey sandy angular to subangular fine to coarse GRAVEL of sandstone with low cobble content. Cobbles are angular to subangular of sandstone.	(1.50)		
MADE GROUND: Dense and medium dense grey and black slightly silty sandy angular to subangular fine to coarse GRAVEL of sandstone, concrete and brick with low cobble content. Cobbles are angular to subangular of sandstone, concrete and brick. Rare strands of steel wire (10mm).	1.50 *+197.74* (2.00)		
Dense becoming very dense brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, siltstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	3.50 *+195.74* (2.10)		
5.00-5.45 m Medium dense			
EXPLORATORY HOLE ENDS AT 5.60 m	5.60 *+193.64*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.50	60 mins	Chisel
1.50 -2.00	90 mins	Chisel
2.00 -3.00	180 mins	Chisel
5.00 -5.50	90 mins	Chisel
5.50 -5.60	60 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole

BH101

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 17/09/2008 **End** 18/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inspection pit GL - 1.20m. Rotary open holed 1.20 - 12.00m. Rotary cored 6.00 - 7.50 and 12.00 - 18.00m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 12.00m / 142mm / 12.00m 12.00m / 18.00m / 106mm	**Ground Level** +199.24 mOD **Coordinates** E 293941.51 **National Grid** N 206685.12 **Chainage**		

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		*	17/09/2008	0800 dry
6.00-7.50	0 NR 0 NR 0 NR			
7.50-7.60		SPT C (50 for 100mm)	7.50	
9.00-9.45		SPT C N=50 (9,10/14,15,15,6)	9.00	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Made ground sandstone gravel and silty clay and bricks and concrete rubble. (Driller's description)	(3.40)		
Small to medium sandy gravel with bands of silty brown clay and large cobbles and sandstone boulders. (Driller's description) (FLUVIAL GLACIAL DEPOSITS)	3.40 *+195.84*		
6.00-7.50 m No recovery.			
7.50 m Very dense.	(8.30)		SP
Stratum continues to 11.70 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	6.00	Rose to 5.90 m after 20 minutes. slow	-
2	10.00	Rose to 7.30 m after 20 minutes. fast	-

Depth Related Remarks *

From	to (m)	
0.00	18.00	Air/mist flush 100% return.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH101R

Sheet 1 of 2

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 17/09/2008 **End** 18/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inspection pit GL - 1.20m. Rotary open holed 1.20 - 12.00m. Rotary cored 6.00 - 7.50 and 12.00 - 18.00m.	**Depth from** / **to** 0.00m / 12.00m 12.00m / 18.00m	**Diameter** 142mm 106mm	**Casing Depth** 12.00m	**Ground Level** +199.24 mOD **Coordinates** E 293941.51 **National Grid** N 206685.12 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.50-10.95			SPT C N=53 (10,12/12,11,15,15)	10.50	
12.00-12.15			SPT C (50,25)	12.00	
12.00-13.50			C 1		
			If NI/10/20		
12.00-13.50	93 52 29				
13.50-15.00			C 2		
13.50-15.00	81 60 41				
15.00-16.50		NI 150 300	C 3		
15.00-16.50	95 71 49				
				17/09/2008 12.00	1700
				18/09/2008 12.00	0800 0.95
16.71			C 4		
16.50-18.00	97 67 55				
				18/09/2008 12.00	1200

Strata

Description (Continued from Sheet 1)

Small to medium sandy gravel with bands of silty brown clay and large cobbles and sandstone boulders. (Driller's description) (FLUVIAL GLACIAL DEPOSITS)

Depth, *Level* (Thickness): 11.70 *+187.54* (0.30)

Grey siltstone with strong sandstone bands. (Driller's description) (LOWER COAL MEASURES)

Depth, *Level* (Thickness): 12.00 *+187.24* (0.30)

Strong locally very strong grey MUDSTONE.
Weathering: Dark grey staining on discontinuity surfaces.
Discontinuities: Subhorizontal and subvertical extremely closely spaced rough undulating with <1mm silt infill.
(LOWER COAL MEASURES)

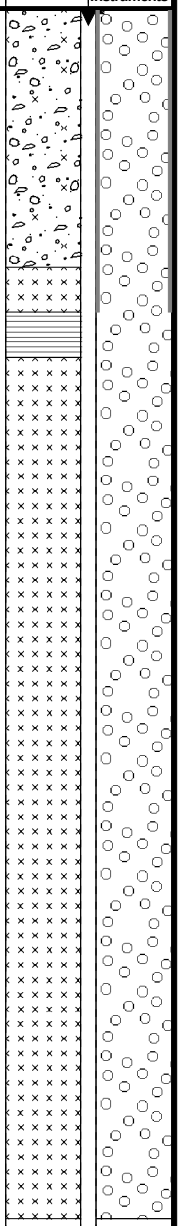
Depth, *Level* (Thickness): 12.30 *+186.94* (5.70)

Very strong grey SILTSTONE.
Weathering: Dark grey staining on discontinuity surfaces, local weakening penetrating <20mm.
Discontinuities: Subhorizontal and 45 degree closely and medium spaced rough and smooth stepped with <1mm silt infill (locally NI). (LOWER COAL MEASURES)

Depth, *Level* (Thickness): 18.00 *+181.24*

EXPLORATORY HOLE ENDS AT 18.00 m

Legend / **Backfill/ Instruments**



Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
2	10.00	Rose to 7.30 m after 20 minutes. fast	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole
BH101R
Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 29/08/2008 **End** 01/09/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion methods 1.20 - 7.50m.	**Depth from** 0.00m	**to** 7.50m	**Diameter** 200mm	**Casing Depth** 7.50m	**Ground Level** +199.16 mOD **Coordinates** E 293857.10 **National Grid** N 206723.94 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			29/08/2008	0800 dry
0.30	ES 1			
0.30	W 2			
0.70	ES 3			
1.20-1.32	SPT C	(25,50 for 40mm)	1.20	1.00
1.20	B 4			
1.50	ES 5			
2.00-2.45	SPT C	N=23 (7,7/7,7,4,5)	2.00	1.00
2.00	B 6			
2.50	ES 7			
3.00-3.45	SPT C	N=2 (2,1/0,1,0,1)	3.00	1.50
3.00-3.45	B 8			
3.45-3.90	SPT C	N=4 (1,1/1,1,1,1)	3.00	1.50
3.50	ES 9			
4.00-4.50	U 10	27 mm rec		
			29/08/2008	1700
			4.50	2.00
4.50-4.70	D 11			
			01/09/2008	0800
			4.50	3.40
5.00-5.45	SPT C	N=20 (1,2/4,5,5,6)	5.00	3.40
5.00	B 12			
6.00-6.45	SPT C	N=30 (4,7/5,5,8,12)	6.00	3.40
6.00	B 13			
6.50-6.88	SPT C	50 (12,13/18,17,15,- for 5mm)	6.50	3.40
7.00	B 14			
7.20	B 15			
			01/09/2008	1700
			7.50	3.40
~~7.50-7.95~~	~~SPT C~~	~~N=42 (4,6/10,10,12,10)~~	~~7.50~~	~~3.40~~

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND: Brown slightly clayey sandy angular to subangular fine to coarse GRAVEL of sandstone with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(1.70)		
Dense brown and grey clayey slightly sandy subangular to subrounded fine to coarse GRAVEL of sandstone with high cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	1.70 *+197.46* (2.20)		
Firm to stiff grey slightly sandy slightly gravelly organic silty CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. (GLACIAL TILL)	3.90 *+195.26* (1.70)		
Medium dense brown and pink slightly silty sandy subangular to subrounded fine to coarse GRAVEL of sandstone, siltstone and quartzite with low cobble content. Cobbles are subrounded of pink sandstone. (Red sandstone boulder - Driller's description.) (FLUVIAL GLACIAL DEPOSITS)	5.60 *+193.56* (1.60)		
Very dense dark grey subangular fine to coarse GRAVEL of siltstone (Possible bedrock).	7.20 *+191.96* (0.30)		
EXPLORATORY HOLE ENDS AT 7.50 m	7.50 *+191.66*		SP

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.70	150 mins	Chisel
1.70 -1.70	30 mins	Chisel
5.60 -5.60	60 mins	Chisel
6.00 -6.00	90 mins	Chisel
6.50 -7.20	90 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH102

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 02/09/2008 **End** 03/09/2008	**Equipment, Methods and Remarks** DANDO 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion metods 1.20m to 8.60m.	**Depth from** 0.00m	**to** 8.70m	**Diameter** 200mm	**Casing Depth** 8.70m	**Ground Level** +198.88 mOD **Coordinates** E 293740.83 **National Grid** N 206755.00 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30	ES 1			
0.60	B 2			
0.70	ES 3			
1.20-1.65	SPT C	N=39 (4,10/10,10,9,10)	1.20	damp
1.20	B 4			
1.50	ES 5			
2.00-2.45	SPT C	N=26 (4,4/6,7,7,6)	2.00	1.50
2.00	B 6			
2.50	ES 7			
2.60	B 8			
3.00-3.50	U 9	27 blows		
3.50	D 10			
3.50	ES 11			
4.00-4.45	SPT S	N=16 (3,4/4,4,4,4)	4.00	2.00
4.00	B 12			
4.50	ES 13			
5.00-5.45	SPT S	N=7 (2,2/2,1,2,2)	5.00	2.60
5.00	B 14			
			02/09/2008 5.70	2.60
6.00-6.45	SPT C	N=8 (2,2/2,2,2,2)	6.00	2.50
6.00	B 15			
6.50	ES 16			
7.00-7.45	SPT C	N=25 (4,6/6,6,7,6)	7.00	2.50
7.00	B 17			
7.50	ES 18			
8.00-8.45	SPT C	N=24 (10,9/8,8,4,4)		
8.00	B 19			
			03/09/2008 8.70	1.50
~~8.70-8.89~~	~~SPT C~~	~~50 (25, for 0mm/ 25,25 for 35mm)~~	~~8.70~~	~~1.50~~
8.70	B 20			

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND Dense brown clayey sandy angular to subangular fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are angular to subangular of sandstone and quartzite.	(2.00)		
Medium dense brown and grey slightly clayey slightly sandy angular to subangular fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are angular to subangular of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	2.00 *+196.88* (0.60) 2.60 *+196.28*		
Soft to firm brown and grey slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. (GLACIAL TILL)	(3.40)		
5.00-6.00 m Grey.			
Loose becoming medium dense grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	6.00 *+192.88* (1.50)		
Medium dense grey and brown slightly clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, quartzite and mudstone with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	7.50 *+191.38* (0.50) 8.00 *+190.88* (0.60)		
Medium dense brown and grey subrounded COBBLES of sandstone and quartzite with a little clay, sand and gravel. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	8.60 *+190.28* 8.70 *+190.18*		
Moderately strong to strong grey stained brown SANDSTONE recovered as angular			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	8.40	Rose to 1.50 m after 20 minutes.	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.60	60 mins	Chisel
7.80 -7.80	45 mins	Chisel
8.40 -8.40	45 mins	Chisel
8.60 -8.70	60 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH103

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 02/09/2008 **End** 03/09/2008	**Equipment, Methods and Remarks** DANDO 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion metods 1.20m to 8.60m.	**Depth from** 0.00m	**to** 8.70m	**Diameter** 200mm	**Casing Depth** 8.70m	**Ground Level** +198.88 mOD **Coordinates** E 293740.83 **National Grid** N 206755.00 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
Depth	**Type & No**	**Records**	**Date Casing**	**Time Water**

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
cobbles of sandstone.			
EXPLORATORY HOLE ENDS AT 8.70 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH103

Borehole Log

Soil Mechanics

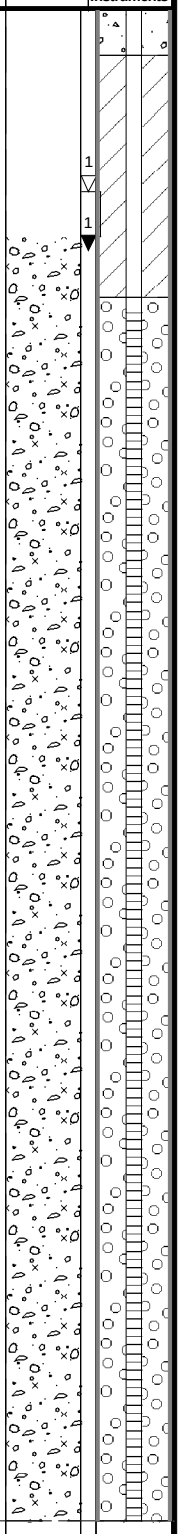
Drilled KO **Logged** RF **Checked** HW	**Start** 23/09/2008 **End** 23/09/2008	**Equipment, Methods and Remarks** Hands England 36 Rotary open hole GL - 10.00m. Rotary cored 10.00 - 15.50m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 10.00m / 142mm / 10.00m 10.00m / 15.50m / 106mm			**Ground Level** +198.88 mOD **Coordinates** E 293740.83 **National Grid** N 206755.00 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			23/09/2008	0800
		Flush: 0.00-15.50 air/mist, 100 %		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Made ground brown clay and sandy gravel reworked. (Driller's description)	(1.50)		
Small to medium sandy gravel with bands of silty brown clay and large cobbles and sandstone boulders. (Driller's description) (FLUVIAL GLACIAL DEPOSITS)	1.50 *+197.38* (8.50)		



Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	1.50	Rose to 1.20 m after 20 minutes. Medium	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH103R

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 23/09/2008 **End** 23/09/2008	**Equipment, Methods and Remarks** Hands England 36 Rotary open hole GL - 10.00m. Rotary cored 10.00 - 15.50m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 10.00m / 142mm / 10.00m 10.00m / 15.50m / 106mm	**Ground Level** +198.88 mOD **Coordinates** E 293740.83 **National Grid** N 206755.00 **Chainage**		

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.00-10.04	SPT C		(50 for 40mm)		
10.00-11.00	0 0 0	NR NR NR	SPT C (50 for 50mm)		
11.00-11.05					
11.00-12.00	0 0 0				
12.00-12.01			SPT C (50 for 10mm)		
12.00-13.00	98 95 85	100 150 580	C 1		
12.00-13.00					
13.00-14.00	90 64 64		C 2		
13.00-14.00					
14.00-15.50	65 62 62	350 500 730	C 3		
14.00-15.50					
		NR NR NR		23/09/2008 10.00	1800 2.10

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Badly broken sandstone with large joints filled with brown sandy silt. (Driller's description) (LOWER COAL MEASURES)	10.00 *+188.88* (2.00)		SP
Very strong grey fine grained SANDSTONE. Weathering: Orange brown staining on discontinuity surfaces. Discontinuities: Subhorizontal above 13.00m closely spaced below 13.00m medium spaced rough planar. (LOWER COAL MEASURES) 13.50-13.70 m Discontinuity 45 degrees rough planar with orange brown staining on surface. 13.70-15.00 m Discontinuities widely spaced.	12.00 *+186.88* (3.00)		
AZCL. Solid sandstone grey fine grained. (Driller's description)	15.00 *+183.88* (0.50)		
EXPLORATORY HOLE ENDS AT 15.50 m	15.50 *+183.38*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole
BH103R
Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 04/09/2008 **End** 08/09/2008	**Equipment, Methods and Remarks** DANDO 2000 Hand dug inspection pit GL - 1.20m. L ight cable percussion methods1.20 - 10.90m.	**Depth from** 0.00m	**to** 10.90m	**Diameter** 200mm	**Casing Depth** 10.90m	**Ground Level** +199.27 mOD **Coordinates** E 293794.50 **National Grid** N 206810.29 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30	ES 1			
0.70	ES 2			
1.20-1.65	SPT C	N=27 (4,4/4,6,10,7)	1.20	dry
1.20-1.65	B 3			
1.50	ES 4			
2.00-2.45	SPT C	N=48 (10,10/10,12,12,14)	2.00	1.50
2.00-2.45	B 5			
2.50	ES 6			
2.60	B 7			
3.00-3.50	U 8	27 blows	3.00	2.00
3.50	ES 9			
4.00-4.45	SPT C	N=8 (2,2/2,2,2,2)	4.00	1.60
4.00-4.45	B 10			
4.50	ES 11			
5.00-5.45	SPT C	N=18 (10,10/6,4,4,4)	5.00	2.00
5.00-5.45	B 12			
5.50	ES 13			
			04/09/2008 5.90	2.00
6.00-6.50	U 14	29 blows		
6.50	ES 15			
7.00-7.45	SPT C	N=36 (6,6/8,8,10,10)	7.00	2.60
7.00-7.45	B 16			
8.00-8.45	SPT C	N=50 (6,10/12,12,14,12)	8.00	2.60
8.00-8.45	B 17			
9.00-9.45	SPT C	N=47 (6,8/10,12,12,13)	9.00	2.60
9.00-9.45	B 18			

Strata

Description	Depth, *Level* (Thickness)
MADE GROUND Medium dense to dense brown very clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(2.60)
Soft grey brown and orange slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. (GLACIAL TILL)	2.60 *+196.67* (1.40)
Soft CLAY with large gravel boulders. (Driller's description)	4.00 *+195.27* (0.40)
Medium dense soft grey brown and orange slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. (GLACIAL TILL)	4.40 *+194.87* (2.60)
6.50-7.00 m Dense	
Brown and grey slightly clayey slightly sandy slightly gravelly subangular to subrounded COBBLES of sandstone and quartzite. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	7.00 *+192.27* (3.90)
Stratum continues to 10.90 m	

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	9.10	-	1.50

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.80	60 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH104

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 04/09/2008 **End** 08/09/2008	**Equipment, Methods and Remarks** DANDO 2000 Hand dug inspection pit GL - 1.20m. L ight cable percussion methods1.20 - 10.90m.	**Depth from** 0.00m	**to** 10.90m	**Diameter** 200mm	**Casing Depth** 10.90m	**Ground Level** +199.27 mOD **Coordinates** E 293794.50 **National Grid** N 206810.29 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
10.00-10.45 10.00-10.45	SPT C B 19	N=53 (10,10/12,14,17,10)	10.00	1.50
			08/09/2008	
~~10.90-11.01~~ 10.90	~~SPT C~~ B 20	~~50 (25 for 70mm/50 for 40mm)~~	10.90 ~~10.90~~	1.90 ~~1.90~~

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Brown and grey slightly clayey slightly sandy slightly gravelly subangular to subrounded COBBLES of sandstone and quartzite. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	10.90 *+188.37*		
EXPLORATORY HOLE ENDS AT 10.90 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
10.50 -10.90	60 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole
BH104
Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 15/09/2008 **End** 15/09/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion methods1.20 - 6.00m.	**Depth from** 0.00m	**to** 6.00m	**Diameter** 200mm	**Casing Depth** 6.00m	**Ground Level** +199.53 mOD **Coordinates** E 293875.60 **National Grid** N 206822.06 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			15/09/2008	0800 dry
0.30	ES 1			
0.70	ES 2			
1.20-1.65	SPT C	N=18 (4,3/4,6,4,4)	1.20	dry
1.20-1.65	B 3			
1.50	ES 4			
2.00-2.45	SPT C	N=11 (2,2/2,3,3,3)	2.00	dry
2.00-2.45	B 5			
2.50	ES 6			
3.00-3.45	SPT C	N=23 (4,8/8,5,5,5)	3.00	dry
3.00-3.45	B 7			
3.50	ES 8			
4.00-4.45	SPT C	N=38 (4,4/8,6,12,12)	4.00	dry
4.00-4.45	B 9			
4.50	ES 10			
5.00-5.45	SPT C	N=29 (12,4/5,8,8,8)	5.00	3.10
5.00	B 11			
			15/09/2008	1800
			6.00	3.10
6.00-6.21	SPT C	50 (14,11 for 45mm/ 31,19 for 15mm)	6.00	3.10
6.00	B 12			

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND: Medium dense brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite (Re-worked natural).	(2.00)		
Medium dense becoming dense dark grey mottled brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	2.00 *+197.53* (2.20)		
Dense becoming very dense grey and brown slightly clayey slightly sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with high cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	4.20 *+195.33* (1.80)		
EXPLORATORY HOLE ENDS AT 6.00 m	6.00 *+193.53*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
5.00 -5.20	30 mins	Chisel
5.60 -6.00	60 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole
BH105
Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 22/09/2008 **End** 22/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inspection pit GL - 1.20m. Rotary open holed 1.20 - 9.00m. Rotary cored 9.00 - 14.50m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 9.00m / 142mm / 9.00m 9.00m / 14.50m / 106mm	**Ground Level** +199.50 mOD **Coordinates** E 293875.60 **National Grid** N 206822.06 **Chainage**		

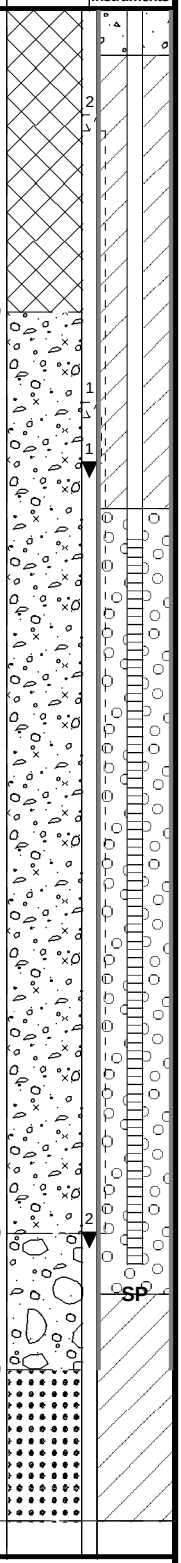
Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			22/09/2008	0800
		Flush: 0.00-14.50 air/mist, 100 %		
8.00-8.06	SPT C	(50 for 60mm)		
9.00-10.00	0 NR 0 NR 0 NR			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)
Made ground brown clay and sandy gravel reworked. (Driller's description)	(2.00)
Small to medium sandy gravel with bands of silty brown clay and large cobbles and sandstone boulders. (Driller's description) (FLUVIAL GLACIAL DEPOSITS)	2.00 *+197.50* (6.10)
Very dense large sandstone boulders with medium sandy gravel, possible top of bedrock. (Driller's description) (FLUVIAL GLACIAL DEPOSITS / WEATHERED BEDROCK)	8.10 *+191.40* (0.90)
Badly broken sandstone with large joints filled with brown sandy silt. (Driller's description) (LOWER COAL MEASURES)	9.00 *+190.50* (1.00)



Depth	Legend	Backfill/ Instruments

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.00	Rose to 2.70 m after 20 minutes. Medium	5.00
2	8.10	Rose to 0.80 m after 20 minutes. Fast	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH105R

Sheet 1 of 2

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 22/09/2008 **End** 22/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inspection pit GL - 1.20m. Rotary open holed 1.20 - 9.00m. Rotary cored 9.00 - 14.50m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 9.00m / 142mm / 9.00m 9.00m / 14.50m / 106mm	**Ground Level** +199.50 mOD **Coordinates** E 293875.60 **National Grid** N 206822.06 **Chainage**			

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.00-10.01			SPT C (50 for 10mm)		
10.00-11.50			C 1		
	95				
10.00-11.50	83				
	75				
11.50-13.00			C 2		
	95	50			
11.50-13.00	67	200			
	59	420			
13.00-14.50			C 3		
13.00			CS 4		
	97				
13.00-14.50	67				
	63				
				22/09/2008 9.00	1800

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Very strong grey fine grained SANDSTONE. Weathering: Rare orange brown staining on discontinuity surfaces. Discontinuities: Subhorizontal and 45 degree medium spaced (locally closely) rough planar and rough stepped, locally with <1mm clay infill. (LOWER COAL MEASURES)	10.00 *+189.50*		
	(4.50)		
14.10-14.20 m NI recovered as angular coarse gravel of sandstone.	14.50 *+185.00*		
EXPLORATORY HOLE ENDS AT 14.50 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH105R

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 09/09/2008 **End** 09/09/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion methods 1.20 - 3.40m.	**Depth from** 0.00m	**to** 3.40m	**Diameter** 200mm	**Casing Depth** 3.40m	**Ground Level** +199.80 mOD **Coordinates** E 293799.73 **National Grid** N 206899.27 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			09/09/2008	0800 dry
0.30	ES 1			
0.70	ES 2			
1.20-1.65	SPT C	N=14 (3,3/4,4,2,4)	1.20	dry
1.20	B 4			
1.50	ES 5			
2.00-2.45	SPT C	N=13 (3,2/3,3,4,3)	2.00	1.60
2.00	B 6			
2.50	ES 7			
3.00-3.43	SPT C	N=46 (16,9 for 55mm/14,14,9,9)	3.00	2.00
3.00	B 8			
			10/09/2008	1200
			3.40	2.00
~~3.40-3.57~~	~~SPT C~~	~~20 (25,30/20 for 20mm)~~	~~3.40~~	~~2.00~~

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND: Brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, quartzite and brick with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(2.00)		
Medium dense becoming dense brown grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobbble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	2.00 *+197.80* (1.20)		
Very dense brown and grey slightly clayey slightly sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with high cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	3.20 *+196.60* 3.40 *+196.40*		
EXPLORATORY HOLE ENDS AT 3.40 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
3.00 -3.40	105 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole
BH106
Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 11/09/2008 **End** 12/09/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable precussion methods 1.20 - 4.20m.	**Depth from** 0.00m	**to** 4.20m	**Diameter** 200mm	**Casing Depth** 4.20m	**Ground Level** +199.95 mOD **Coordinates** E 293981.43 **National Grid** N 206822.81 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			11/09/2008	0800 dry
0.30	ES 1			
0.70	ES 2			
1.20-1.65	SPT C	N=20 (4,2/4,6,6,4)	1.20	dry
1.20-1.45	B 3			
			11/09/2008	1700
			1.80	dry
2.00-2.45	SPT C	N=27 (3,3/4,5,9,9)	2.00	1.80
2.00-2.45	B 4			
2.50	ES 5			
3.00-3.45	SPT C	N=37 (4,5/8,9,10,10)	3.00	2.40
3.00-3.45	B 6			
3.50	ES 7			
4.00-4.09	SPT C	(75 for 90mm)	4.00	3.00
4.00-4.09	B 8		12/09/2008	1700
4.20-4.26	SPT C	(75 for 55mm)	4.00	3.00

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND: Medium dense brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite (Re-worked natural).	(1.80)		
	1.80 *+198.15*		
Medium dense becoming dense brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	(2.00)		
	3.80 *+196.15*		
Moderately strong grey stained brown SANDSTONE recovered as: angular fine to coarse gravel of sandstone.	(0.40)		
	4.20 *+195.75*		
EXPLORATORY HOLE ENDS AT 4.20 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.80	90 mins	Chisel
3.80 -4.00	60 mins	Chisel
4.00 -4.20	60 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH107

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 18/09/2008 **End** 19/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inpsection pit GL - 1.20m. Rotary open holed 1.20 - 8.50m. Rotary cored 8.50 - 13.50m.	**Depth from** / **to** 0.00m / 8.50m 8.50m / 13.50m	**Diameter** 142mm 106mm	**Casing Depth** 8.50m	**Ground Level** +199.92 mOD **Coordinates** E 293970.55 **National Grid** N 206841.49 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			18/09/2008	0800
4.50-4.95	SPT C	N=48 (9,10/11,13,12,12)		
6.00-6.45	SPT C	N=43 (9,10/10,10,11,12)		
		Flush: 0.00-13.50 air/mist, 100 %		
7.50-7.95	SPT C	N=41 (10,10/9,10,11,11)		
8.50-8.51 8.50-10.00	SPT C 1	(50 for 10mm)		
8.50-10.00	63 5 0	NI NI 80		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Made ground sandstone gravel and silty clay and bricks and concrete rubble. (Driller's description)	(1.70)		
Dense small to medium sandy gravel with bands of silty brown clay and large cobbles and sandstone boulders. (Driller's description) (FLUVIAL GLACIAL DEPOSITS)	1.70 *+198.22*		
	(6.60)		
Badly broken sandstone with large joints filled with brown sandy silt. (Driller's description)	8.30 *+191.62* 8.50 *+191.42*		
Medium strong locally strong grey fine grained SANDSTONE. Largely NI recovered as medium to coarse angular gravel. Weathering: Orange brown discolouration on discontinuity surfaces. Discontinuities: Intact core very closely to closely spaced subhorizontal	(2.50)		
Stratum continues to 11.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	0.90	Rose to 0.80 m after 20 minutes. Fast	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Borehole
BH107R
Sheet 1 of 2

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 18/09/2008 **End** 19/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inpsection pit GL - 1.20m. Rotary open holed 1.20 - 8.50m. Rotary cored 8.50 - 13.50m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 8.50m / 142mm / 8.50m 8.50m / 13.50m / 106mm	**Ground Level** +199.92 mOD **Coordinates** E 293970.55 **National Grid** N 206841.49 **Chainage**			

Samples and Tests

Strata

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
10.00-11.00			C 2			and subvertical smooth stepped, with <2mm sandy silt infill. (LOWER COAL MEASURES)			
10.00-11.00	98 6 0			18/09/2008 8.50	1800				
11.00-12.00			C 3	19/09/2008 8.50	0800 0.80	No recovery. Badly broken sandstone with large joints filled with brown sandy silt. (Driller's description) (LOWER COAL MEASURES)	11.00 *+188.92* (1.00)		
11.00-12.00	0 0 0	NR NR NR							
12.00-12.04			SPT C (50 for 40mm)				12.00 *+187.92*		
12.00-13.50			C 4			Very strong grey fine grained SANDSTONE. Weathering: Orange brown staining on discontinuity surfaces. Discontinuities: Subhorizontal and subvertical very closely to closely spaced rough planar and smooth stepped. (LOWER COAL MEASURES)	(1.50)		
12.00-13.50	67 29 13	NI 30 100							
				19/09/2008 8.50	1300				
13.50-13.53			SPT C (80 for 30mm)			EXPLORATORY HOLE ENDS AT 13.50 m	13.50 *+186.42*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

AGS

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Borehole

BH107R

Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 10/09/2008 **End** 10/09/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion methods 1.20 - 1.80m.	**Depth from** 0.00m	**to** 1.80m	**Diameter** 200mm	**Casing Depth** 1.80m	**Ground Level** +199.87 mOD **Coordinates** E 293862.79 **National Grid** N 206911.57 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30	ES 1			
0.70	ES 2			
1.20-1.43	SPT C	50 (10,12/50)	1.20	dry
1.20	B 3			
1.50	ES 4			
~~1.80-2.02~~	~~SPT C~~	~~50 (25,25/50 for 70mm)~~	~~1.80~~	~~1.00~~
1.80	D 5		10/09/2008	0800
			1.80	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Very dense brown clayey slightly gravelly subangular fine to coarse GRAVEL of sandstone and quartzite with high cobble content. Cobbles are subangular of sandstone and quartzite. (FLUVIAL GLACIAL DEPOSITS)	(1.80)		
EXPLORATORY HOLE ENDS AT 1.80 m	1.80 *+198.07*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.80	90 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole
BH108
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Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 18/09/2008 **End** 22/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inspection pit GL - 1.20m. Rotary open holed 1.20 - 6.00m. Rotary cored 6.00 - 12.00m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 6.00m / 142mm / 6.00m 6.00m / 12.00m / 106mm	**Ground Level** +199.87 mOD **Coordinates** E 293862.79 **National Grid** N 206911.57 **Chainage**			

Samples and Tests

Depth	Type & No	TCR SCR RQD	If	Records	Date Casing	Time Water
3.00-3.45	SPT C			N=39 (5,7/10,9,9,11)		
4.50-4.95	SPT C			N=41 (8,9/9,10,9,13)		
6.00-6.06	SPT C			(50 for 60mm)	18/09/2008 6.00	1800
6.00-7.00	0 0 0				22/09/2008 6.00	0800 0.80
7.00-7.02				SPT C (50 for 20mm)		
7.00-8.00	0 0 0					
8.00-8.01			NR NR NR	SPT C (50 for 10mm)		
8.00-9.00	0 0 0					
9.00-9.06				SPT C (50 for 55mm)		
9.00-10.00	0 0 0					

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Dense small to medium sandy gravel with bands of silty brown clay and large cobbles and sandstone boulders. (Driller's description) (FLUVIAL GLACIAL DEPOSITS)	(4.60)		
Dense large sandstone boulders with medium sandy gravel possible top of bedrock. (Driller's description)	4.60 *+195.27* (1.20)		
No recovery. Badly broken sandstone with large joints filled with brown sandy silt. (Driller's description) (LOWER COAL MEASURES)	5.80 *+194.07* (4.20)		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	0.90	Rose to 0.80 m after 20 minutes. Fast	-

Depth Related Remarks *

From / to (m)

Chiselling

Depths (m) / Time / Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

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Carried out for Enviroparks Ltd

Borehole

BH108R

Sheet 1 of 2

Borehole Log

Soil Mechanics

Drilled KO **Logged** RF **Checked** HW	**Start** 18/09/2008 **End** 22/09/2008	**Equipment, Methods and Remarks** Hands England 36 Hand dug inspection pit GL - 1.20m. Rotary open holed 1.20 - 6.00m. Rotary cored 6.00 - 12.00m.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 6.00m / 142mm / 6.00m 6.00m / 12.00m / 106mm	**Ground Level** +199.87 mOD **Coordinates** E 293862.79 **National Grid** N 206911.57 **Chainage**			

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.00-10.02			SPT C (50 for 15mm)		
10.00-11.00			C 1		
	67				
10.00-11.00	10				
	10	NI			
		30			
		100			
11.00			SPT C (50 for 0mm)		
11.00-12.00			C 2		
11.34			CS 3		
	85				
11.00-12.00	55				
	55	250			
		250			
		350		22/09/2008 6.00	1800
12.00-12.02			SPT C (50 for 20mm)		

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Very strong grey fine grained SANDSTONE. Weathering: Orange brown and dark grey staining on discontinuity surfaces. Discontinuities: Subhorizontal and subvertical very closely and closely spaced rough planar, with upto 40mm sandy silt infill. (some core loss). (LOWER COAL MEASURES)	10.00 *+189.87* (1.40)		
Very strong grey fine grained SANDSTONE. Weathering: Slight brown staining on discontinuity surfaces. Discontinuities: Subhorizontal medium spaced rough planar. (LOWER COAL MEASURES)	11.40 *+188.47* (0.60)		
EXPLORATORY HOLE ENDS AT 12.00 m	12.00 *+187.87*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

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Carried out for Enviroparks Ltd

Borehole

BH108R

Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled MY **Logged** PL **Checked** HW	**Start** 10/09/2008 **End** 11/09/2008	**Equipment, Methods and Remarks** Dando 2000 Hand dug inspection pit GL - 1.20m. Light cable percussion methods 1.20 - 3.00m.	**Depth from** 0.00m	**to** 3.00m	**Diameter** 200mm	**Casing Depth** 3.00m	**Ground Level** +199.96 mOD **Coordinates** E 293933.25 **National Grid** N 206877.21 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			10/09/2008	0800 dry
0.30	ES 1			
0.70	ES 2			
1.20-1.29	SPT C	(75 for 90mm)	1.20	0.30
1.20-1.29	B 3			
1.50	ES 4			
2.00-2.45	SPT C	N=31 (10,10/8,7,8,8)	2.00	1.50
2.00-2.45	B 5			
2.50	ES 6			
2.80	B 7		11/09/2008	1700
			3.00	0.30
~~3.00-3.06~~	~~SPT C~~	~~(75 for 60mm)~~	~~3.00~~	~~0.30~~

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MADE GROUND: Grey brown and red slightly silty slightly sandy angular to subangular fine to coarse GRAVEL of sandstone, brick, concrete and quartzite with medium cobble content. Cobbles are angular to subangular of sandstone, concrete and brick.	(2.80)		
Moderately strong grey stained brown SANDSTONE recovered as: angular fine to coarse gravel of sandstone (Possible weathered bedrock).	2.80 *+197.16* 3.00 *+196.96*		SP
EXPLORATORY HOLE ENDS AT 3.00 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
1.20 -1.50	60 mins	Chisel
1.80 -2.00	30 mins	Chisel
2.30 -2.50	30 mins	Chisel
2.50 -2.80	90 mins	Chisel
2.80 -3.00	90 mins	Chisel

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Hirwaun Industrial Estate

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Carried out for Enviroparks Ltd

Borehole

BH109

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 22/08/2008 **End** 22/08/2008	**Equipment, Methods and Remarks** CAT 428C Machine excavated trial pit GL - 0.50m. Pit moved 5.00m NW.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A D B C 305 (Deg)	**Ground Level** +199.65 mOD **Coordinates** E 293921.63 **National Grid** N 206645.27 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		* 0800 22/08/2008 dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite.	(0.50)		
EXPLORATORY HOLE ENDS AT 0.50 m	0.50 *+199.15*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.50	Pit terminated at 0.50m due to discovery of blue water pipe marker tape.

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP1

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 22/08/2008 **End** 22/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL- 3.80m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 305 (Deg)	**Ground Level** +199.51 mOD **Coordinates** E 293916.98 **National Grid** N 206649.83 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		1000
0.30	ES 1	
0.30	D 6	
0.50	B 11	
0.70	ES 2	
0.70	D 7	
1.50	B 12	
1.50	ES 3	
1.50	D 8	
2.50	B 13	
2.50	ES 4	
2.50	D 9	
3.50	D 10	
3.50	B 14	
3.50	ES 5	
		22/08/2008 dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite.	0.10 *+199.41*		
2 MADE GROUND: Dark brown very clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. 3 boulders of 650 x 650m.	(0.80)		
3 MADE GROUND: Soft to firm black grey and brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone, quartzite and brick.	0.90 *+198.61*		
	(1.20)		
4 Soft to firm brown mottled orange and grey slightly sandy slightly gravelly silty CLAY with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible reworked natural material. (GLACIAL TILL)	2.10 *+197.41*		
	(1.70)		
EXPLORATORY HOLE ENDS AT 3.80 m	3.80 *+195.71*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP1A

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 22/08/2008 **End** 22/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.50m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D → 205 (Deg)	**Ground Level** +199.44 mOD **Coordinates** E 293949.01 **National Grid** N 206705.96 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		1200
0.30	ES 1	
0.30	D 7	
0.50	B 13	
0.70	ES 2	
0.70	D 8	
1.30	ES 3	
1.30	D 9	
1.50	B 14	
1.70	D 10	
1.70	ES 4	
2.50	B 15	
2.70	D 11	
2.70	ES 5	
3.30	D 12	
3.30	ES 6	22/08/2008 1400
3.50	B 16	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Dark brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite.	0.10 *+199.34*		
2 MADE GROUND: Brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(1.30)		
3 MADE GROUND: Dark grey silty sandy subangular to subrounded fine to coarse GRAVEL of sandstone, quartzite and brick with medium cobble content. Cobbles are subangular to subrounded of sandstone, quartzite and brick. Rare fragments of glass, metal and wall ties. Small pockets of clay. 1 boulder of quartzite (750 x 700mm).	1.40 *+198.04* (0.60)		
4 MADE GROUND: Soft to firm black , brown and grey slightly sandy slightly gravelly clayey SILT with much decomposed plant material. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite with rare whole bricks. 2.70-2.80 m Strong hydrocarbon smell	2.00 *+197.44* (1.50)		
EXPLORATORY HOLE ENDS AT 3.50 m	3.50 *+195.94*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	2.40	Remained at 2.40 m after 20 minutes. Seepage

Depth Related Remarks *
From to (m)

Stability Stable
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
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Carried out for Enviroparks Ltd

Trial Pit
TP2
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 21/08/2008 **End** 21/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 2.30m. Trench was opened to 6.00m for observation of wall.	**Dimensions and Orientation** Width 0.60 m Length 6.00 m A / D / B / C 160 (Deg)	**Ground Level** +199.66 mOD **Coordinates** E 293960.06 **National Grid** N 206769.19 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.20	ES 1	
0.20	D 5	
0.20	B 9	
0.50	B 10	
0.50	ES 2	
0.50	D 6	
1.20	B 11	
1.20	ES 3	
1.20	D 7	
1.90	B 12	
1.90	ES 4	
1.90	D 8	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite.	(0.30)		
	0.30 *+199.36*		
2 MADE GROUND: Orange brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Rare steel bar 15mm x 15mm.			
Double brick cavity wall at 2.20m depth running at 220 degrees. Bricks are orange red and cement bonded.	(2.00)		
2.20 m Brick wall			
EXPLORATORY HOLE ENDS AT 2.30 m	2.30 *+197.36*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	0.00	Seepage from surface

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP3

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 22/08/2008 **End** 22/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.50m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 230 (Deg)	**Ground Level** +199.29 mOD **Coordinates** E 293876.50 **National Grid** N 206719.70 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 11	
0.30	D 6	
0.70	ES 2	
0.70	D 7	
1.30	B 12	
1.40	ES 3	
1.40	D 8	
2.30	B 13	
2.40	ES 4	
2.40	D 9	
3.30	B 14	
3.40	D 10	
3.40	ES 5	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown very clayey sandy subangular to subrounded fine to coarsre GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.40)		
2 MADE GROUND: Brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, quartzite and brick with low cobble content. Cobbles are subangular to subrounded of sandstone, quartzite and brick.	0.40 *+198.89* (2.20)		
3 MADE GROUND: Soft to firm grey and black slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. 3 boulders of quartzite 700mm x 700mm. Rare small pockets of black silty sand 100mm x 100mm. Possible re-worked natural material.	2.60 *+196.69* (0.90)		
EXPLORATORY HOLE ENDS AT 3.50 m	3.50 *+195.79*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP4

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 22/08/2008 **End** 22/08/2008	**Equipment, Methods and Remarks** cat428c Machine excavated trial pit GL - 3.60m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A / D / B / C → 220 (Deg)	**Ground Level** +199.27 mOD **Coordinates** E 293841.16 **National Grid** N 206752.36 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 11	
0.30	D 6	
0.60	B 12	
0.60	ES 2	
0.60	D 7	
1.20	B 13	
1.20	ES 3	
1.20	D 8	
2.00	ES 4	
2.00	D 9	
2.20	B 14	
3.00	D 10	
3.00	ES 5	
3.20	B 15	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Dark brown clayey subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.40)		
	0.40 *+198.87*		
2 MADE GROUND: Orange brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.30)		
	0.70 *+198.57*		
3 MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Rare gravel sized lumps of green glassy fused slag.	(0.80)		
	1.50 *+197.77*		
4 MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(1.10)		
	2.60 *+196.67*		
5 MADE GROUND: Soft to firm grey brown and black slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone, brick and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. Rare fragments of cardboard and steel wire. 3.00 m 2 boulders of quartzite 700mm x 700mm	(1.00)		
	3.60 *+195.67*		
EXPLORATORY HOLE ENDS AT 3.60 m			

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	0.00	Seepage from surface

Depth Related Remarks *
From to (m)

Stability Stable
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Trial Pit
TP5
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 20/08/2008 **End** 20/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.50m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A / D / B / C → 212 (Deg)	**Ground Level** +199.05 mOD **Coordinates** E 293790.98 **National Grid** N 206748.53 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 13	
0.30	D 7	
0.70	ES 2	
0.70	D 8	
0.90	B 14	
0.90	ES 3	
0.90	D 9	
1.60	D 10	
1.60	B 15	
1.60	ES 4	
2.60	D 11	
2.60	B 16	
2.60	ES 5	
3.50	D 12	
3.50	B 17	
3.50	ES 6	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite.	0.10 *+198.95*		
2 MADE GROUND: Brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.50)		
3 MADE GROUND: Orange brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked natural material.	0.60 *+198.45* (1.40)		
4 MADE GROUND: Grey mottled black clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked natural material.	2.00 *+197.05* (1.00)		
5 Soft to firm grey brown and black clayey SILT with rare small pockets of black woody peat and many roots and rootlets. (ALLUVIUM)	3.00 *+196.05* (0.50)		
EXPLORATORY HOLE ENDS AT 3.50 m	3.50 *+195.55*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Stability Collapsing below 2.00m.

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP6

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 21/08/2008 **End** 21/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.80m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 140 (Deg)	**Ground Level** +199.20 mOD **Coordinates** E 293755.36 **National Grid** N 206802.22 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 13	
0.30	D 7	
0.70	B 14	
0.70	ES 2	
0.70	D 8	
1.20	B 15	
1.20	ES 3	
1.20	D 9	
2.20	D 10	
2.20	B 16	
2.20	ES 4	
3.20	D 11	
3.20	B 17	
3.20	ES 5	
3.70	D 12	
3.70	B 18	
3.70	ES 6	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Brown clayey sandy angular to subangular fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are angular to subangular of sandstone and quartzite.	(0.40)		
2 MADE GROUND: Grey and dark grey very clayey sandy angular to subangular fine to coarse GRAVEL of sandstone, brick and quartzite with low cobble content. Cobbles are angular to subangular of sandstone and quartzite.	0.40 *+198.80* (0.55)		
3 Brown orange and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. (FLUVIAL GLACIAL DEPOSITS)	0.95 *+198.25* (0.75)		
4 Grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. (FLUVIAL GLACIAL DEPOSITS)	1.70 *+197.50* (1.80)		
5 Soft to firm grey mottled brown and orange slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. (GLACIAL TILL)	3.50 *+195.70* (0.30)		
EXPLORATORY HOLE ENDS AT 3.80 m	3.80 *+195.40*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	0.00	Seepage from surface

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP7

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 21/08/2008 **End** 21/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 2.30m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 200 (Deg)	**Ground Level** +199.43 mOD **Coordinates** E 293863.26 **National Grid** N 206795.70 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 11	
0.30	D 6	
0.60	ES 2	
0.60	D 7	
0.80	B 12	
0.80	ES 3	
0.80	D 8	
1.50	B 13	
1.50	ES 4	
1.50	D 9	
2.10	D 10	
2.10	B 14	
2.10	ES 5	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite.	0.10 *+199.33*		
2 MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.60)		
3 Orange brown very clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. Unable to progress below 2.30m. (POSSIBLE FLUVIAL GLACIAL DEPOSITS)	0.70 *+198.73*		
	(1.60)		
EXPLORATORY HOLE ENDS AT 2.30 m	2.30 *+197.13*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	0.00	Strong inflow from surface

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

408.24 08/01/2009 13:48:57

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP8

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 21/08/2008 **End** 21/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.50m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 178 (Deg)	**Ground Level** +199.93 mOD **Coordinates** E 293971.87 **National Grid** N 206818.72 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.20	ES 1	
0.20	B 11	
0.20	D 6	
0.70	B 12	
0.70	ES 2	
0.70	D 7	
1.40	B 13	
1.40	ES 3	
1.40	D 8	
2.40	B 14	
2.40	ES 4	
2.40	D 9	
3.40	D 10	
3.40	B 15	
3.40	ES 5	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.30) 0.30 *+199.63*		
2 MADE GROUND: Grey and brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, brick and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(1.00) 1.30 *+198.63*		
3 MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, brick and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone, brick and quartzite.	(1.60) 2.90 *+197.03*		
4 Soft grey slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. (GLACIAL TILL)	(0.60) 3.50 *+196.43*		
EXPLORATORY HOLE ENDS AT 3.50 m			

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

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Carried out for Enviroparks Ltd

Trial Pit

TP9

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged	PL	Start	20/08/2008	Equipment, Methods and Remarks	Dimensions and Orientation	Ground Level	+199.54 mOD
Checked	HW	End	20/08/2008	CAT428C Machine excavated trial pit GL - 3.10m.	Width 0.60 m Length 5.00 m A / D / B / C → 130 (Deg)	Coordinates National Grid Chainage	E 293832.84 N 206821.27

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	D 5	
0.30	B 9	
0.70	B 10	
0.70	ES 2	
0.70	D 6	
1.70	B 11	
1.70	ES 3	
1.70	D 7	
2.70	B 12	
2.70	ES 4	
2.70	D 8	
		*

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite.	(0.70)		
2 MADE GROUND: Grey and dark grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, brick and quartzite with rare whole bricks. Rare fragments of steel wire, clay pipe and glass. Pit was terminated at 3.10m due to a black cast iron pipe of approximately 9 inches diameter running the length of the pit.	0.70 *+198.84* (2.40)		
EXPLORATORY HOLE ENDS AT 3.10 m	3.10 *+196.44*		

Depth	Type & No.	Records Date

Groundwater Entries

No. Struck (m)	Post Strike Behaviour
None observed (see Key Sheet)	

Depth Related Remarks *

From (m)	to (m)	
3.10		Cast iron pipe

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP10

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 20/08/2008 **End** 20/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.50m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D → 238 (Deg)	**Ground Level** +199.98 mOD **Coordinates** E 293809.63 **National Grid** N 206940.04 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 10	
0.30	D 6	
0.60	ES 2	
1.20	B 11	
1.30	ES 3	
1.30	D 7	
2.20	B 12	
2.30	ES 4	
2.30	D 8	
3.20	B 13	
3.30	ES 5	
3.30	D 9	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft dark brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone, brick and quartzite. Cobbles are subangular to subrounded of sandstone, brick and quartzite. Rare whole bricks.	(0.40)		
	0.40 *+199.58*		
2 MADE GROUND: Black silty fine SAND.	(0.30)		
	0.70 *+199.28*		
3 MADE GROUND: Soft grey brown and blue slightly organic silty CLAY.	(0.70)		
	1.40 *+198.58*		1
4 MADE GROUND:Stiff brown orange and grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. Rare fragments of glass, asbestos cement and metal.	(2.10)		
	3.50 *+196.48*		
EXPLORATORY HOLE ENDS AT 3.50 m			

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.40	Seepage

Depth Related Remarks *

From to (m)

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

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Carried out for Enviroparks Ltd

Trial Pit

TP11

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 20/08/2008 **End** 20/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 1.80m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 225 (Deg)	**Ground Level** +199.83 mOD **Coordinates** E 293845.19 **National Grid** N 206914.26 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.10	ES 1	
0.10	D 4	
0.10	B 8	
0.30	D 5	
0.30	B 7	
0.50	ES 2	
1.30	ES 3	
1.30	D 6	
1.30	B 9	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite.	0.10 *+199.73*		
2 Orange brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. (POSSIBLE FLUVIAL GLACIAL DEPOSITS)	(1.60)		1
3 Grey angular COBBLES AND BOULDERS of sandstone and quartzite. Possible weathered bedrock.	1.70 *+198.13*		
EXPLORATORY HOLE ENDS AT 1.80 m	1.80 *+198.03*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.40	Strong inflow

Depth Related Remarks *
From to (m)

Stability Collapsing below 1.50m.
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Trial Pit
TP11A
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 18/08/2008 **End** 18/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 1.75m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 265 (Deg)	**Ground Level** +199.90 mOD **Coordinates** E 293875.53 **National Grid** N 206902.89 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	D 4	
0.30	B 7	
0.70	ES 2	
0.70	D 5	
0.70	B 8	
1.30	ES 3	
1.30	D 6	
1.30	B 9	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 Brown slightly clayey sandy angular fine to coarse GRAVEL of sandstone and quartzite with high cobble content. Cobbles are angular of sandstone and quartzite. Possible weathered bedrock.	(1.75)		
EXPLORATORY HOLE ENDS AT 1.75 m	1.75 *+198.15*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.70	Seepage

Depth Related Remarks *
From to (m)

Stability Stable

Shoring None

Weather Heavy rain

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Trial Pit
TP12
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 20/08/2008 **End** 20/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 1.80m. Pit was 1.40m from north boudary fence.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 105 (Deg)	**Ground Level** +200.56 mOD **Coordinates** E 293874.48 **National Grid** N 206934.10 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.20	ES 1	
0.20	D 4	
0.20	B 7	
0.60	ES 2	
0.60	D 5	
0.60	B 8	
1.50	ES 3	
1.50	D 6	
1.50	B 9	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft dark brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone, brick and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.30) 0.30 *+200.26*		
2 Stiff orange brown and grey slightly sandy slightly gravelly silty CLAY with high cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. Unable to progress beyond 1.80m.	(1.50)		
1.70 m Possible weathered bedrock at base of trial pit.			
EXPLORATORY HOLE ENDS AT 1.80 m	1.80 *+198.76*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.80	Seepage

Depth Related Remarks *
From to (m)

Stability Stable
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
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Trial Pit
TP12A
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 19/08/2008 **End** 19/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 2.30m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 310 (Deg)	**Ground Level** +200.39 mOD **Coordinates** E 293900.08 **National Grid** N 206910.71 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	D 5	
0.30	B 9	
0.70	B 10	
0.70	ES 2	
0.70	D 6	
1.30	B 11	
1.30	ES 3	
1.30	D 7	
2.30	B 12	
2.30	ES 4	
2.30	D 8	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft black sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone, brick and quartzite. Cobbles are subangular to subrounded of sandstone, brick and quartzite.	(0.35)		
2 Stiff orange brown and grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. Possible weathered bedrock. (GLACIAL TILL)	0.35 *+200.04* (1.95)		
2.00 m Possible weathered bedrock at base of trial pit.			
EXPLORATORY HOLE ENDS AT 2.30 m	2.30 *+198.09*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.80	Strong inflow

Depth Related Remarks *
From to (m)

Stability Stable
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Trial Pit
TP14
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 18/08/2008 **End** 18/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 2.80m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A B C D 270 (Deg)	**Ground Level** +201.10 mOD **Coordinates** E 293926.53 **National Grid** N 206915.37 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	D 5	
0.30	B 9	
0.70	B 10	
0.70	ES 2	
0.70	D 6	
1.30	B 11	
1.30	ES 3	
1.30	D 7	
2.30	B 12	
2.30	ES 4	
2.30	D 8	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Soft brown sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite Cobbles are subangular to subrounded of sandstone and quartzite	(0.30) 0.30 *+200.80*		
2 MADE GROUND: Black and grey silty sandy angular to subangular fine to coarse GRAVEL of sandstone, brick and mudstone with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.50) 0.80 *+200.30*		
3 Firm to stiff brown orange and grey slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. (GLACIAL TILL)	(0.60) 1.40 *+199.70*		
4 Brown silty very sandy angular to subangular fine to coarse GRAVEL of sandstone and quartzite with low cobble content. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. (FLUVIAL GLACIAL DEPOSITS)	(1.40)		
EXPLORATORY HOLE ENDS AT 2.80 m	2.80 *+198.30*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.80	Seepage

Depth Related Remarks *

From to (m)

Stability Collapsing below 1.40m.

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Trial Pit

TP15

Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 19/08/2008 **End** 19/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.20m.	**Dimensions and Orientation** Width 0.60 m Length 2.50 m A / D / B / C → 292 (Deg)	**Ground Level** +201.48 mOD **Coordinates** E 293960.69 **National Grid** N 206892.10 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	D 4	
0.30	B 7	
1.00	ES 2	
1.00	D 5	
1.00	B 8	
2.30	ES 3	
2.30	D 6	
2.30	B 9	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone, brick and quartzite with high cobble content. Cobbles are subangular to subrounded of sandstone, brick and quartzite.	(0.40)		1
	0.40 *+201.08*		
2 MADE GROUND: Dark grey and green fused slag recovered as angular fine to coarse gravel.	0.50 *+200.98*		
3 MADE GROUND: Brown and grey clayey sandy subangular to subrounded fine to coarse GRAVEL of sandstone and quartzite with medium cobble content. Cobbles are subangular to subrounded of sandstone and quartzite.	(0.30)		
	0.80 *+200.68*		
4 Stiff brown orange and grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. Possible re-worked material. (GLACIAL TILL)	(2.40)		
EXPLORATORY HOLE ENDS AT 3.20 m	3.20 *+198.28*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	0.30	Strong inflow

Depth Related Remarks *
From to (m)

Stability Collapsing below 2.00m.
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Trial Pit
TP16
Sheet 1 of 1

Trial Pit Log

Soil Mechanics

Logged PL **Checked** HW	**Start** 19/08/2008 **End** 19/08/2008	**Equipment, Methods and Remarks** CAT428C Machine excavated trial pit GL - 3.50m.	**Dimensions and Orientation** Width 0.80 m Length 7.00 m A B C D 100 (Deg)	**Ground Level** +203.44 mOD **Coordinates** E 293965.94 **National Grid** N 206926.16 **Chainage**

Samples and Tests

Depth	Type & No.	Date Records
		0800
0.30	ES 1	
0.30	B 13	
0.30	D 7	
0.70	B 14	
0.70	ES 2	
0.70	D 8	
1.20	B 15	
1.20	ES 3	
1.20	D 9	
1.50	D 10	
1.50	B 16	
1.50	ES 4	
2.50	D 11	
2.50	B 17	
2.50	ES 5	
3.50	D 12	
3.50	B 18	
3.50	ES 6	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
1 MADE GROUND: Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse of sandstone, brick and quartzite. Cobbles are subangular to subrounded of sandstone, brick and quartzite.	(0.90)		
2 MADE GROUND: Firm to stiff orange grey and brown slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of sandstone and quartzite. Cobbles are subangular to subrounded of sandstone and quartzite. 3 boulders of quartzite 400mm x 400mm. 1.35m: Black cast iron pipe approximately 15 inch diameter with a small steel pipe directly below it. An electric cable alongside with a small plastic water pipe alongside the cable. All are at 48 degrees. Black cast iron pipe was encased in grey black silty clay.	0.90 *+202.54* (2.60)		1
EXPLORATORY HOLE ENDS AT 3.50 m	3.50 *+199.94*		

Depth	Type & No.	Records Date

Groundwater Entries

No.	Struck (m)	Post Strike Behaviour
1	1.30	Strong inflow

Depth Related Remarks *
From to (m)

Stability Collapsing below 2.00m
Shoring None
Weather Raining

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project Hirwaun Industrial Estate
Project No. H8076
Carried out for Enviroparks Ltd

Trial Pit
TP17
Sheet 1 of 1

ENCLOSURE B
INSTRUMENTATION AND MONITORING

Groundwater Installation Details

Hole No	Instrument ID	Installation Type	Date of Installation	Reference depth (mBGL)	Piezometer Diameter (mm)	Top of response zone (mBGL)	Base of response zone (mBGL)	Tubing Completion Details	Headworks	Remarks
BH101R		SP	18 Sep 2008	0.00	50	1.00	7.00	Open	Lockable top cover	
BH102	1	SP	1 Sep 2008	0.00	50	1.00	7.50	Gas tap	Lockable top cover	
BH103R		SP	23 Sep 2008	0.00	50	2.00	11.50	open	lockable top cover	
BH105R		SP	22 Sep 2008	0.00	50	3.50	8.30	open	lockable top cover	
BH109		SP	11 Sep 2008	0.00	50	1.50	3.00	Gas tap	Lockable top cover	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Electronic Piezometer Prepared: 12/11/2008 11:22

AGS

Project Hirwaun Industrial Estate

Project No. H8076

Carried out for Enviroparks Ltd

Table

B1

Borehole	BH101	BH102	BH103	BH104	BH105	BH106	BH107	BH108	BH109
Date Installed									
Depth to Base (m)	5.26	6.91	12.47		8.27				2.58
Ground Level (m A.O.D)									
Date	Depth to Water from GL (m)								
06-Oct-08	2.42	2.24	2.10		2.04				0.14
09-Oct-08	2.31		2.13		2.06				0.10
17-Oct-08	2.39	2.21	2.12		2.05				0.12
31-Oct-08	2.27	2.25	2.10		2.04				0.16

Remarks:

Groundwater Monitoring	**Project:** **Hirwain Industrial Estate**	**Contract** **H8076**
Soil Mechanics	**Client:**	**Figure No** **B2**

Date :	09/10/2008	Meteorological and Site Conditions	
Operator:	JL	State of ground	Damp
		Wind	Light
		Wind Direction	West
		Cloud Cover	20%
		Precipitation	None
		Barometric Pressure (mb)	1013
		Temperature(deg.C)	12

Equipment Used:	Multi Gas Meter, Gas Flow Meter

Borehole	Instrument Depth (m)	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	H2S (ppm)	Flow rate (Ltr/hr)	PID (PPM)	Water Level (m)
BH101	5.26	19.70	-	1.2	0.0	0.1	0.0	2.31
BH102	6.91	17.60	-	1.3	0.0	0.2	0.0	
BH103	12.47	18.20	-	1.2	0.0	0.4	0.0	2.13
BH105	8.27	20.10	-	0.2	0.0	0.0	0.0	2.06
BH109	2.58	21.00	-	0.1	0.0	0.1	0.0	0.10

Remarks: CH4 and LEL have been voided due to false readings

The concentrations of gases recorded above are subject to the accuracy, as specified by the manufacturer, of the instrument adopted. If concentration accuracies of less than +/- 2% are required, it is recommended that gas samples are recovered and laboratory analyses are undertaken.

Gas Monitoring / Groundwater	Project: Hirwaun Inustrial Estate	Contract: H8076
Soil Mechanics	Client: Pell Frischmann	Figure: B3

Date :	31/10/2008
Operator:	JL

Meteorological and Site Conditions

State of ground	Wet
Wind	Light
Wind Direction	Northerly
Cloud Cover	Clear
Precipitation	None
Barometric Pressure (mb)	988
Temperature(deg.C)	7.5

Equipment Used: Multi Gas Meter, Gas Flow Meter

Borehole	Instrument Depth (m)	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	H2S (ppm)	Flow rate (Ltr/hr)	PID (PPM)	Water Level (m)
BH101	5.26	19.10	-	1.3	-	0.3	0.0	2.27
BH102	6.91	15.40	-	1.2	-	0.1	0.0	2.25
BH103	12.47	17.00	-	1.4	-	0.2	0.0	2.10
BH105	8.27	20.80	-	0.0	-	0.1	0.0	2.04
BH109	2.58	20.70	-	0.1	-	0.1	0.0	0.16

Remarks:

The concentrations of gases recorded above are subject to the accuracy, as specified by the manufacturer, of the instrument adopted. If concentration accuracies of less than +/- 2% are required, it is recommended that gas samples are recovered and laboratory analyses are undertaken.

Gas Monitoring / Groundwater	**Project:** Hirwaun Industrial Estate	**Contract:** H8076
Soil Mechanics	**Client:** Pell Frischmann	**Figure:** B4

Date :	07/11/2008	Meteorological and Site Conditions	
Operator:	JL	State of ground	Light Rain
		Wind	strong
		Wind Direction	westerly
		Cloud Cover	30%
		Precipitation	slight
		Barometric Pressure (mb)	1011
		Temperature(deg.C)	6.0

Equipment Used:	Multi Gas Meter, Gas Flow Meter

Borehole	Instrument Depth (m)	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	H2S (ppm)	Flow rate (Ltr/hr)	PID (PPM)	Water Level (m)
BH101	5.26	20.10	0.5	0.0	0.0	0.1	0.0	2.30
BH102	6.91	17.40	0.8	0.6	0.0	0.2	0.0	2.28
BH103	12.47	17.20	1.2	0.9	0.0	0.3	0.0	2.09
BH105	8.27	20.40	0.7	0.2	0.0	0.1	0.0	2.09
BH109	2.58	20.40	0.1	0.1	0.0	0.1	0.0	0.09

Remarks:

The concentrations of gases recorded above are subject to the accuracy, as specified by the manufacturer, of the instrument adopted. If concentration accuracies of less than +/- 2% are required, it is recommended that gas samples are recovered and laboratory analyses are undertaken.

Gas Monitoring / Groundwater	Project: Hirwaun Industrial Estate	Contract: H8076
Soil Mechanics	Client: Pell Frischmann	Figure: B5

Date :	11/11/2008	Meteorological and Site Conditions	
Operator:	CP	State of ground	Saturated
		Wind	Strong Gusts
		Wind Direction	West
		Cloud Cover	90%
		Precipitation	None
		Barometric Pressure (mb)	978
		Temperature(deg.C)	8
Equipment Used:		Multi Gas Meter, Gas Flow Meter	

Borehole	Instrument Depth (m)	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	H2S (ppm)	Flow rate (Ltr/hr)	PID (PPM)	Water Level (m)
BH101	5.26	19.20	0.3	4.3	0.0	0.1	0.0	2.31
BH102	6.91	19.70	0.3	0.4	0.0	0.1	0.0	2.31
BH103	12.47	19.10	0.1	0.2	0.0	0.1	0.0	2.21
BH105	8.27	19.80	0.3	0.3	0.0	0.1	0.0	2.11
BH109	2.58	19.70	0.1	0.1	0.0	0.1	0.0	0.04

Remarks:

The concentrations of gases recorded above are subject to the accuracy, as specified by the manufacturer, of the instrument adopted. If concentration accuracies of less than +/- 2% are required, it is recommended that gas samples are recovered and laboratory analyses are undertaken.

Gas Monitoring / Groundwater	**Project:**	**Hirwaun Industrial Estate**	**Contract: H8076**
Soil Mechanics	**Client:**	**Pell Frischmann**	**Figure: B6**

ENCLOSURE C

GEOTECHNICAL LABORATORY TEST RESULTS

INDEX PROPERTIES - SUMMARY OF RESULTS

Project No	Project Name
H8076	Hirwaun Industrial Estate

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p Mg/m³	p_d Mg/m³	w %	< 425 µm sieve %	W_L %	W_P %	I_P	p_s Mg/m³	Remarks
BH101	9	4.00	4.45	B	Brown grey clayey sandy fine to coarse subrounded GRAVEL with high cobble			7.2						
BH102	11	4.50	4.70	D	Grey brown slightly sandy CLAY			21	100	34 a	19	15		
BH103	12	4.00		B	Brown grey slightly sandy slightly gravelly CLAY			38	92 s	50 a	23	27		
BH104	8	3.00	3.50	U	Brown sandy CLAY	1.79	1.44	24						
BH104	12	5.00	5.45	B	Brown grey slightly gravelly CLAY			19	79 s	26 a	16	10		
BH105	7	3.00	3.45	B	Brown grey slightly gravelly slightly sandy slightly organic SILT with low cobble content			20						
BH109	3	1.20	1.29	B	Brown grey slightly clayey very sandy fine to coarse subangular GRAVEL with low cobble			12						
TP11	10	0.30		B	Grey brown slightly sandy slightly gravelly CLAY			29	72 s	41 a	23	18		
TP11	12	2.20		B	Orange brown grey slightly gravelly sandy CLAY			24	92 s	36 a	18	18		
TP12A	5	0.60		D	Brown grey slightly sandy gravelly CLAY			21	63 s	43 a	22	21		
TP14	10	0.70		B	Brown slightly sandy slightly gravelly CLAY			18	75 s	38 a	18	20		
TP15	11	1.30		B	Brown slightly sandy slightly gravelly CLAY			18	85 s	28 a	17	11		
TP1A	9	2.50		D	Brown grey slightly sandy slightly gravelly CLAY			19	82 s	31 a	18	13		
TP5	13	1.20		B	Grey brown very silty very sandy GRAVEL with low cobble content			8.1						
TP7	18	3.70		B	Brown grey slightly sandy slightly gravelly CLAY			16	98 s	28 a	15	13		
TP9	15	3.40		B	Brown grey slightly sandy gravelly CLAY			8.1	68 s	27 a	17	10		

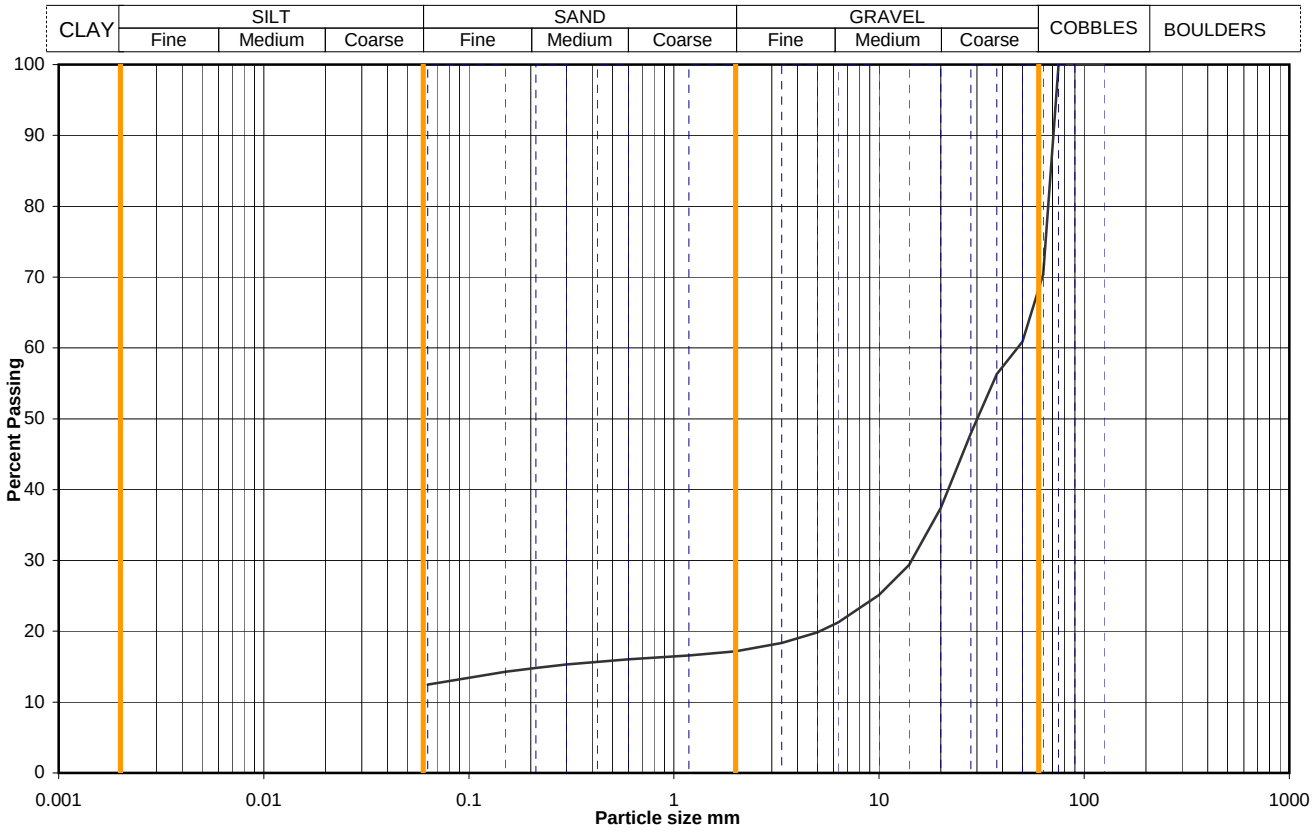
General notes: All above tests carried out to BS1377 : 1990 definitive method in all cases unless annotated otherwise. See individual test reports for further details.

Key :

p	bulk density, linear	W_L Liquid limit	W_P	Plastic limit	<425um preparation	p_s	particle density
p_d	dry density	a 4 point cone test	NP	non - plastic	n from natural soil	-g = gas jar	
w	moisture content	b 1 point cone test	I_P	Plasticity Index	s sieved specimen	-p = small pyknometer	

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH101		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	4.00		
			Samp No	9	Type	B
			ID	ESGH807620080902000000246		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	70		
50	61		
37.5	56		
28	48		
20	37		
14	29		
10	25		
6.3	21		
5.0	20		
3.35	18		
2.00	17		
1.18	17		
0.600	16		
0.425	16		
0.300	15	Dry mass of sample, kg	
0.212	15		
0.150	14	4.3	
0.063	12		

Soil description	Brown grey clayey sandy fine to coarse subrounded GRAVEL with high cobble content		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	32	0
	Gravel	51	75
	Sand	5	7
	Silt	silt+clay =	
	Clay	12	18

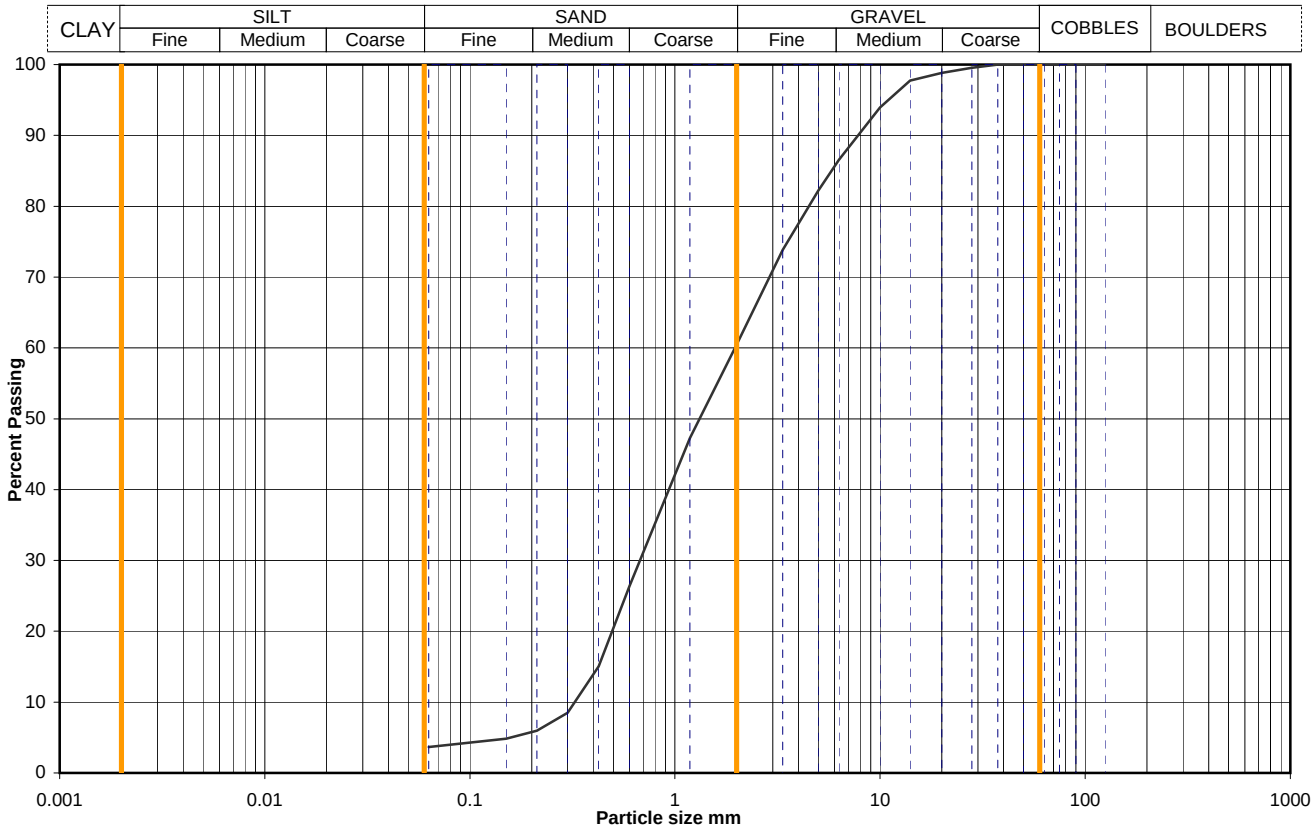
Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2.9 Rev 78 Jan 08	Soil Mechanics	UKAS TESTING 4089	Printed:27/10/2008 14:29	**Figure** **PSD 1**

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH102		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	6.00		
			Samp No	13	Type	B
			ID	ESGH807620080916000000263		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	98		
10	94		
6.3	87		
5.0	82		
3.35	74		
2.00	60		
1.18	47		
0.600	26		
0.425	15		
0.300	8	Dry mass of sample, kg	
0.212	6		
0.150	5	11.1	
0.063	4		

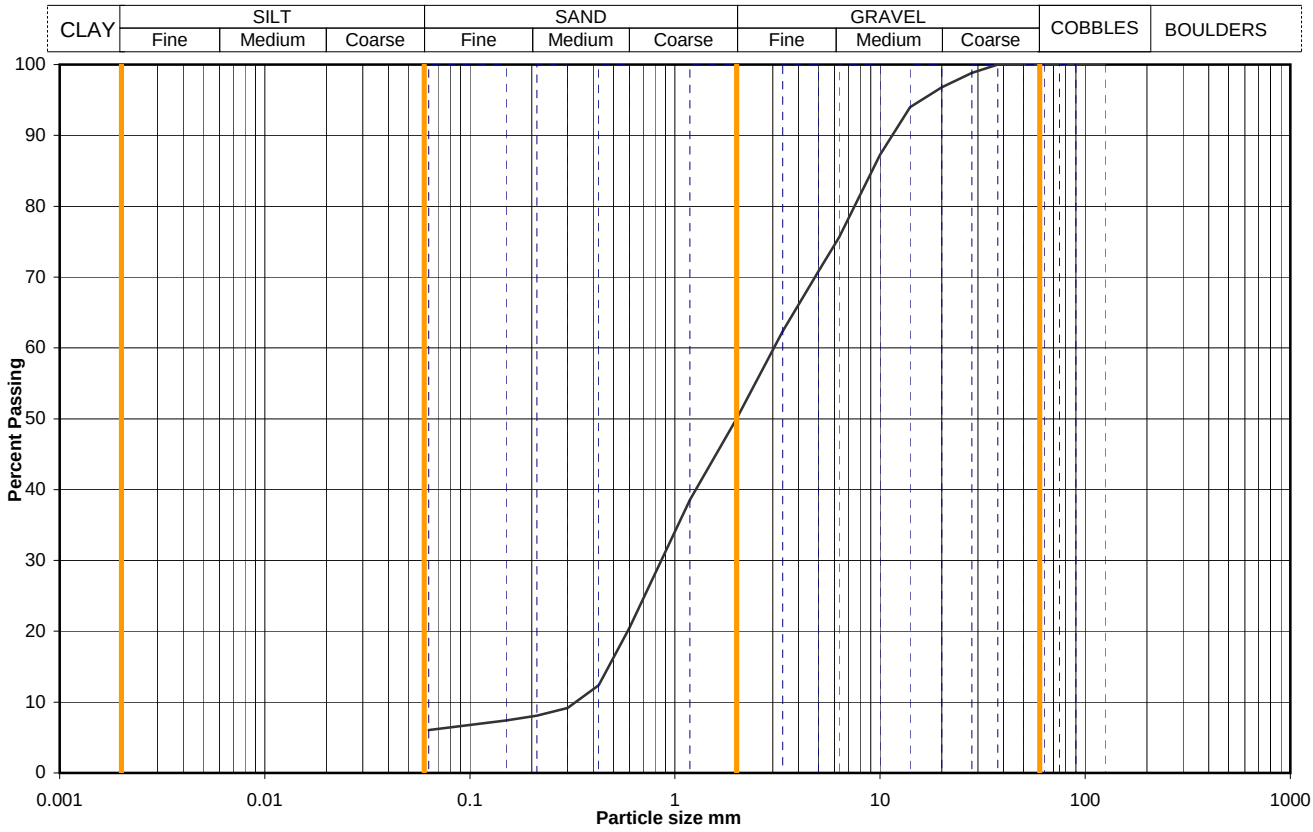
Soil description	Brown grey slightly clayey gravelly SAND		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	40	40
	Sand	57	57
	Silt	silt+clay =	
	Clay	3	3

Uniformity Coefficient	D_{60} / D_{10}	6

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH103		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	7.00		
			Samp No	17	Type	B
			ID	ESGH807620080916000000282		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	99		
20	97		
14	94		
10	87		
6.3	76		
5.0	71		
3.35	62		
2.00	50		
1.18	39		
0.600	20		
0.425	12		
0.300	9	Dry mass of sample, kg	
0.212	8		
0.150	7	8.0	
0.063	6		

Soil description	Brown grey clayey SAND and GRAVEL		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	50	50
	Sand	44	44
*<60mm values to aid description only	Silt	silt+clay =	
	Clay	6	6

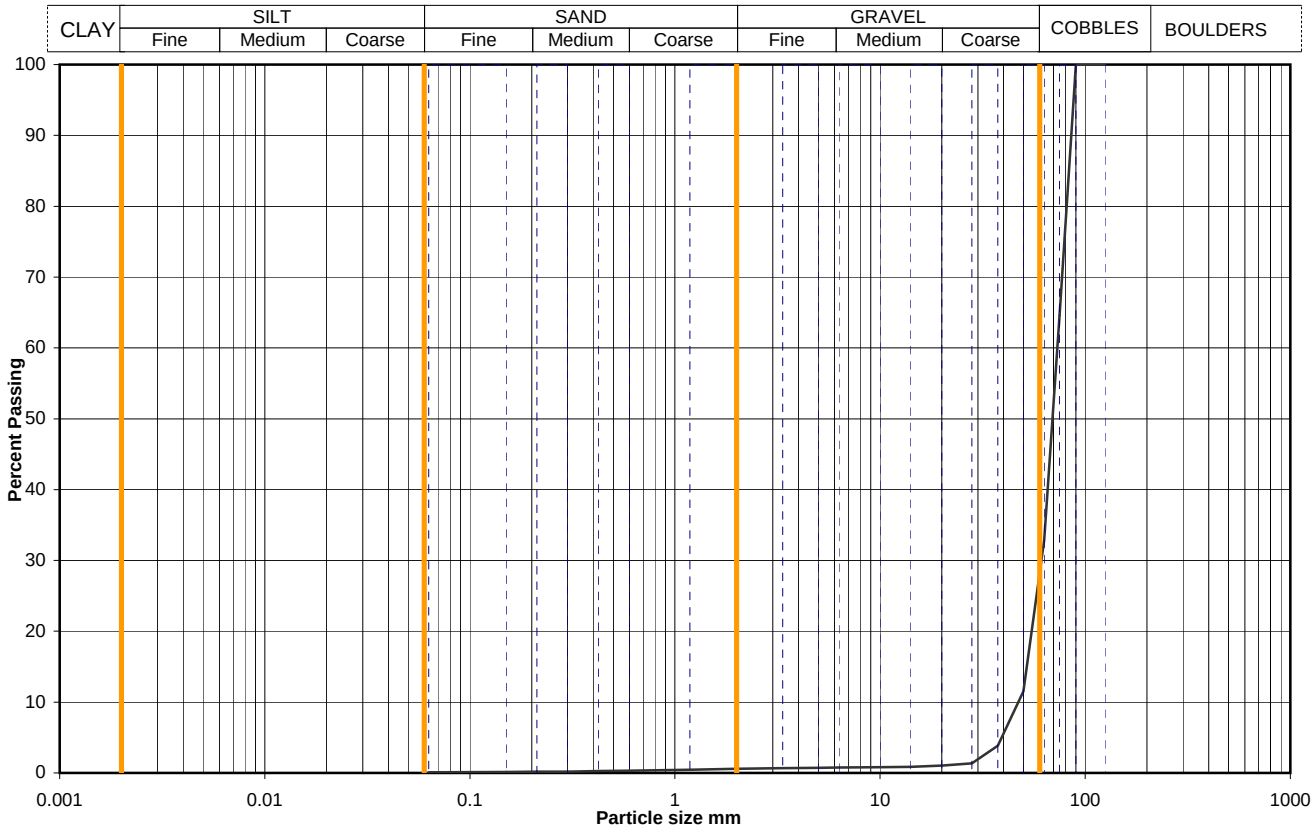
Uniformity Coefficient	D_{60} / D_{10}	9

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2.9 Rev 78 Jan 08	Soil Mechanics	UKAS TESTING 4089	Printed:27/10/2008 14:29	**Figure** **PSD 3**

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH104		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	8.00		
			Samp No	17	Type	B
			ID	ESGH807620080916000000302		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	65		
63	33		
50	12		
37.5	4		
28	1		
20	1		
14	1		
10	1		
6.3	1		
5.0	1		
3.35	1		
2.00	1		
1.18	0		
0.600	0		
0.425	0		
0.300	0	Dry mass of sample, kg	
0.212	0		
0.150	0	8.5	
0.063	0		

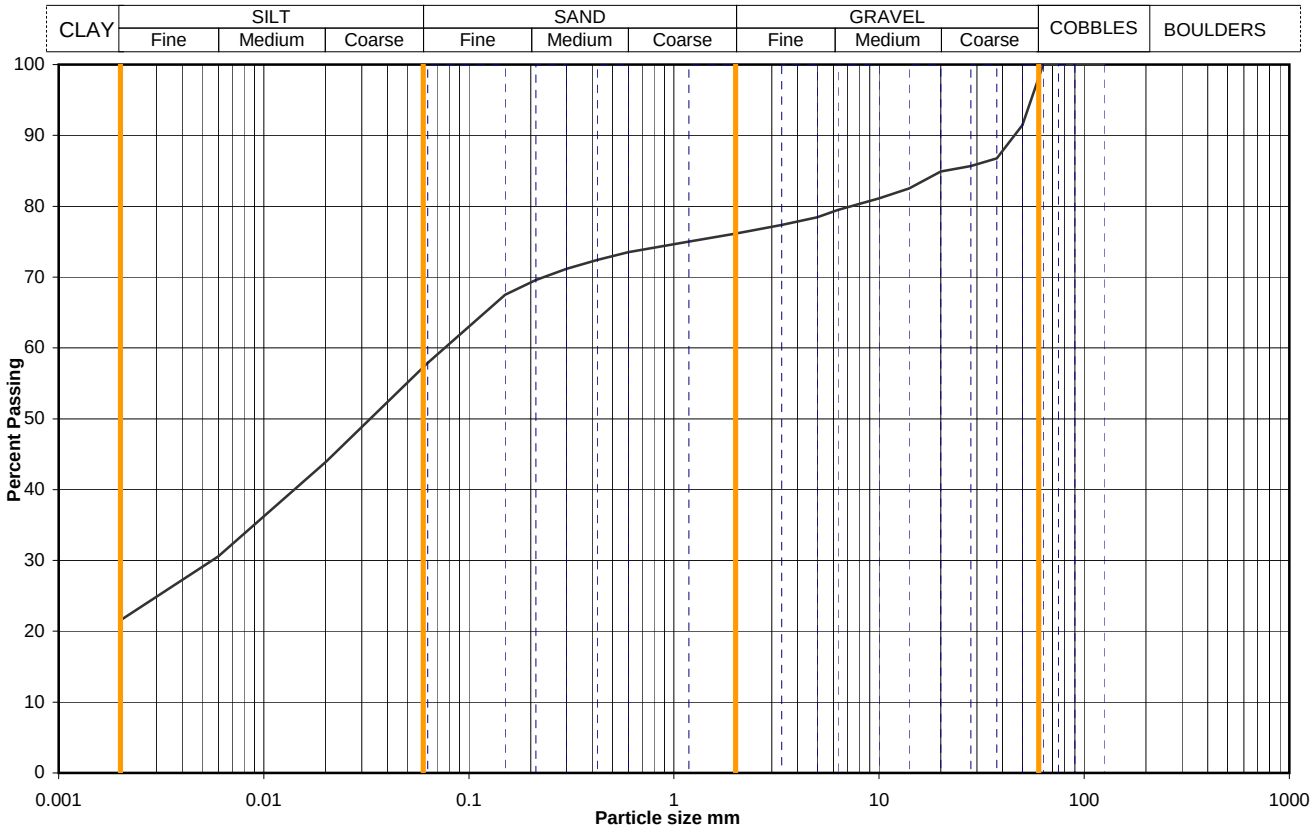
Soil description	COBBLES with much slightly sandy GRAVEL		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	72	0
	Gravel	27	96
	Sand	1	4
	Silt	silt+clay =	
	Clay	0	0

Uniformity Coefficient	D_{60} / D_{10}	2

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH105		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	3.00		
			Samp No	7	Type	B
			ID	ESGH807620080916000000312		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	44
90	100	0.0060	31
75	100	0.0020	22
63	100		
50	91		
37.5	87		
28	86		
20	85		
14	83		
10	81		
6.3	79		
5.0	78		
3.35	77		
2.00	76		
1.18	75	Particle density, Mg/m3	
0.600	74		
0.425	72	2.65 assumed	
0.300	71	Dry mass of sample, kg	
0.212	70		
0.150	67	9.3	
0.063	58		

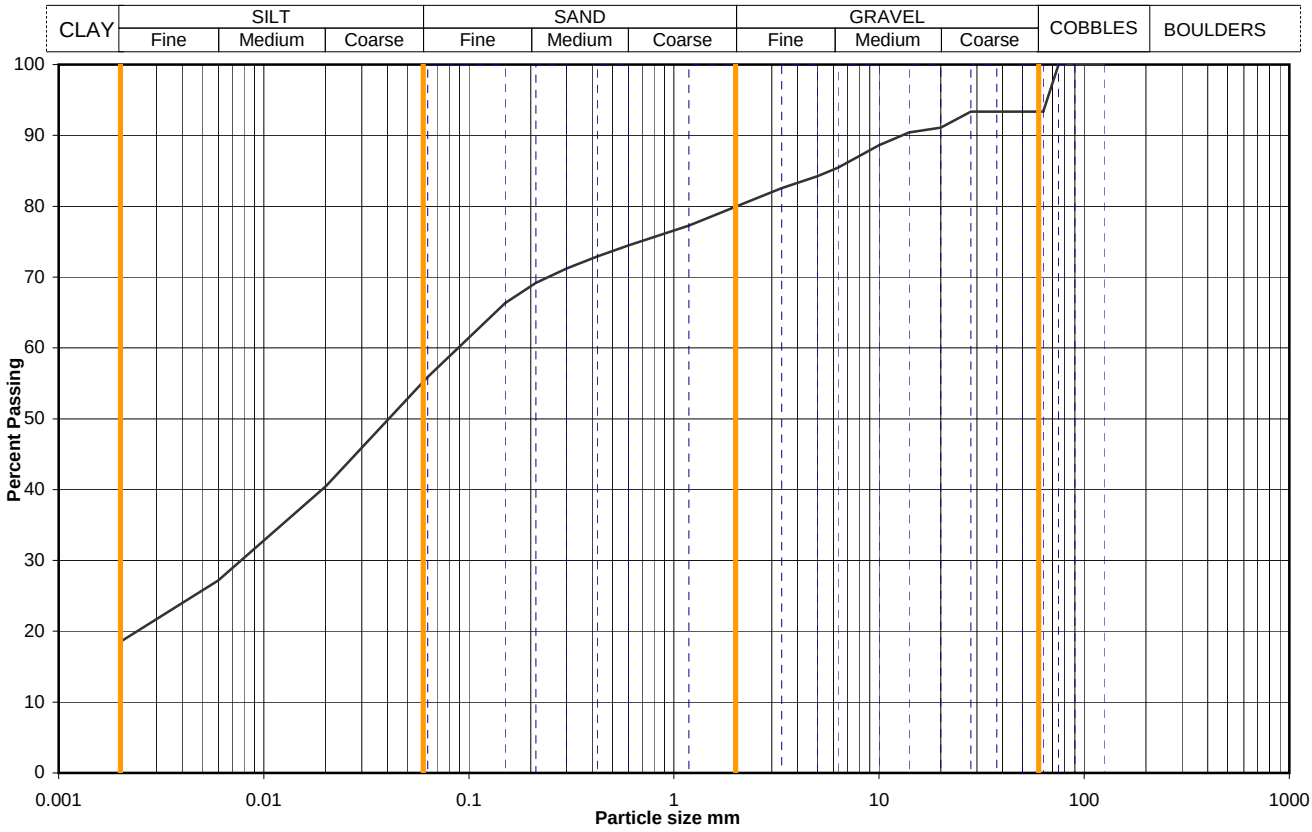
Soil description	Brown grey slightly gravelly slightly sandy slightly organic SILT with low cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	2	0
	Gravel	22	22
	Sand	19	19
	Silt	36	37
	Clay	21	21

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH106		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	2.00		
			Samp No	6	Type	B
			ID	ESGH8076200809160000000322		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	40
90	100	0.0060	27
75	100	0.0020	19
63	93		
50	93		
37.5	93		
28	93		
20	91		
14	90		
10	89		
6.3	85		
5.0	84		
3.35	83		
2.00	80		
1.18	77	Particle density, Mg/m3	
0.600	74		
0.425	73	2.65 assumed	
0.300	71	Dry mass of sample, kg	
0.212	69		
0.150	66	5.8	
0.063	56		

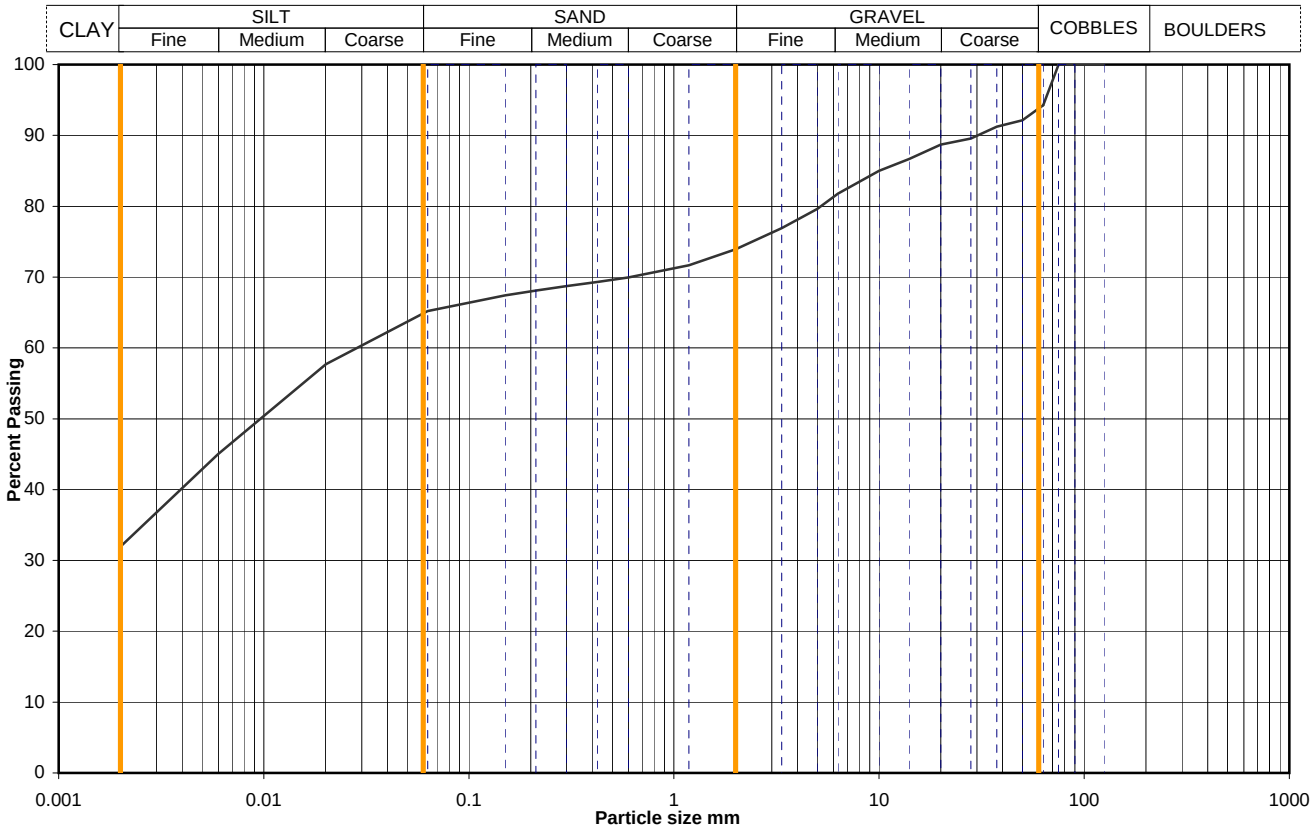
Soil description	Brown grey slightly gravelly slightly sandy SILT with low cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	7	0
	Gravel	13	14
	Sand	25	27
	Silt	37	40
	Clay	18	19

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH107		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	3.00		
			Samp No	6	Type	B
			ID	ESGH807620080916000000330		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	58
90	100	0.0060	45
75	100	0.0020	32
63	94		
50	92		
37.5	91		
28	90		
20	89		
14	87		
10	85		
6.3	82		
5.0	80		
3.35	77		
2.00	74		
1.18	72	Particle density, Mg/m3	
0.600	70		
0.425	69	2.65 assumed	
0.300	69	Dry mass of sample, kg	
0.212	68		
0.150	67	8.5	
0.063	65		

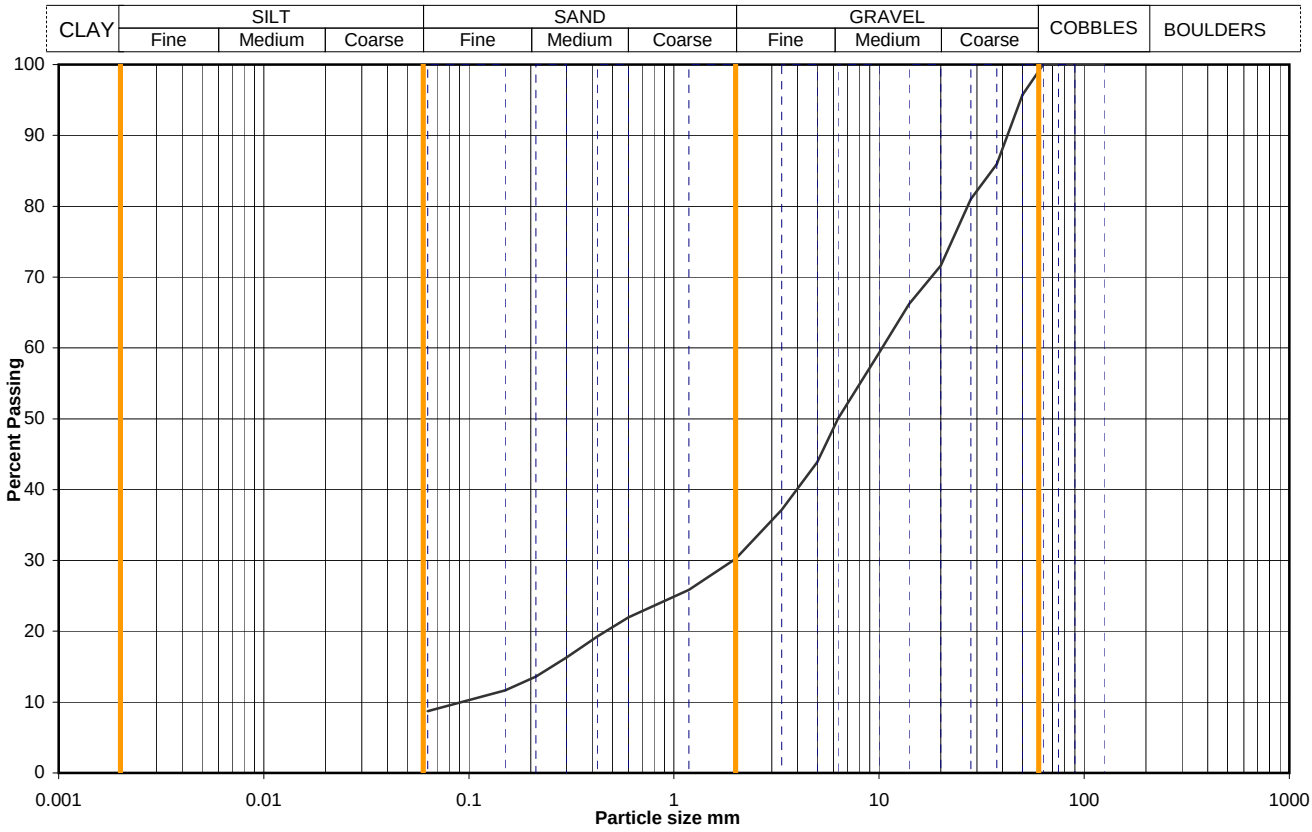
Soil description	Brown grey slightly gravelly slightly sandy CLAY with low cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	6	0
	Gravel	20	21
	Sand	9	10
	Silt	33	35
	Clay	32	34

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	BH109		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	1.20		
			Samp No	3	Type	B
			ID	ESGH807620080916000000340		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	96		
37.5	86		
28	81		
20	72		
14	66		
10	59		
6.3	50		
5.0	44		
3.35	37		
2.00	30		
1.18	26		
0.600	22		
0.425	19		
0.300	16	Dry mass of sample, kg	
0.212	14		
0.150	12	11.4	
0.063	9		

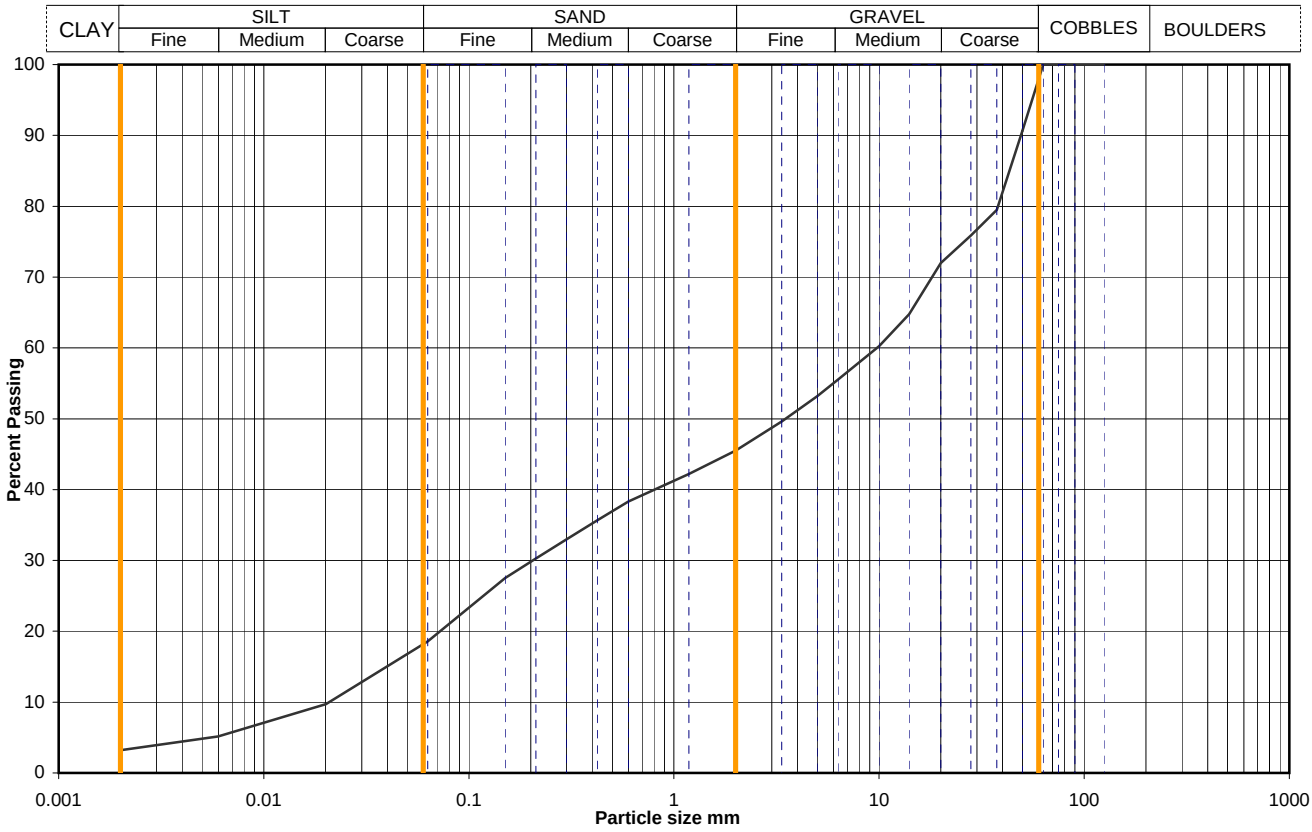
Soil description	Brown grey slightly clayey very sandy fine to coarse subangular GRAVEL with low cobble content		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	1	0
	Gravel	69	70
	Sand	21	21
	Silt	silt+clay =	
	Clay	9	9

Uniformity Coefficient	D_{60} / D_{10}	113

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	TP11A		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	1.30		
			Samp No	9	Type	B
			ID	ESGH807620080827000000034		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	10
90	100	0.0060	5
75	100	0.0020	3
63	100		
50	91		
37.5	79		
28	76		
20	72		
14	65		
10	60		
6.3	56		
5.0	53		
3.35	50		
2.00	45		
1.18	42	Particle density, Mg/m3	
0.600	38		
0.425	36	2.65 assumed	
0.300	33	Dry mass of sample, kg	
0.212	30		
0.150	28	18.0	
0.063	19		

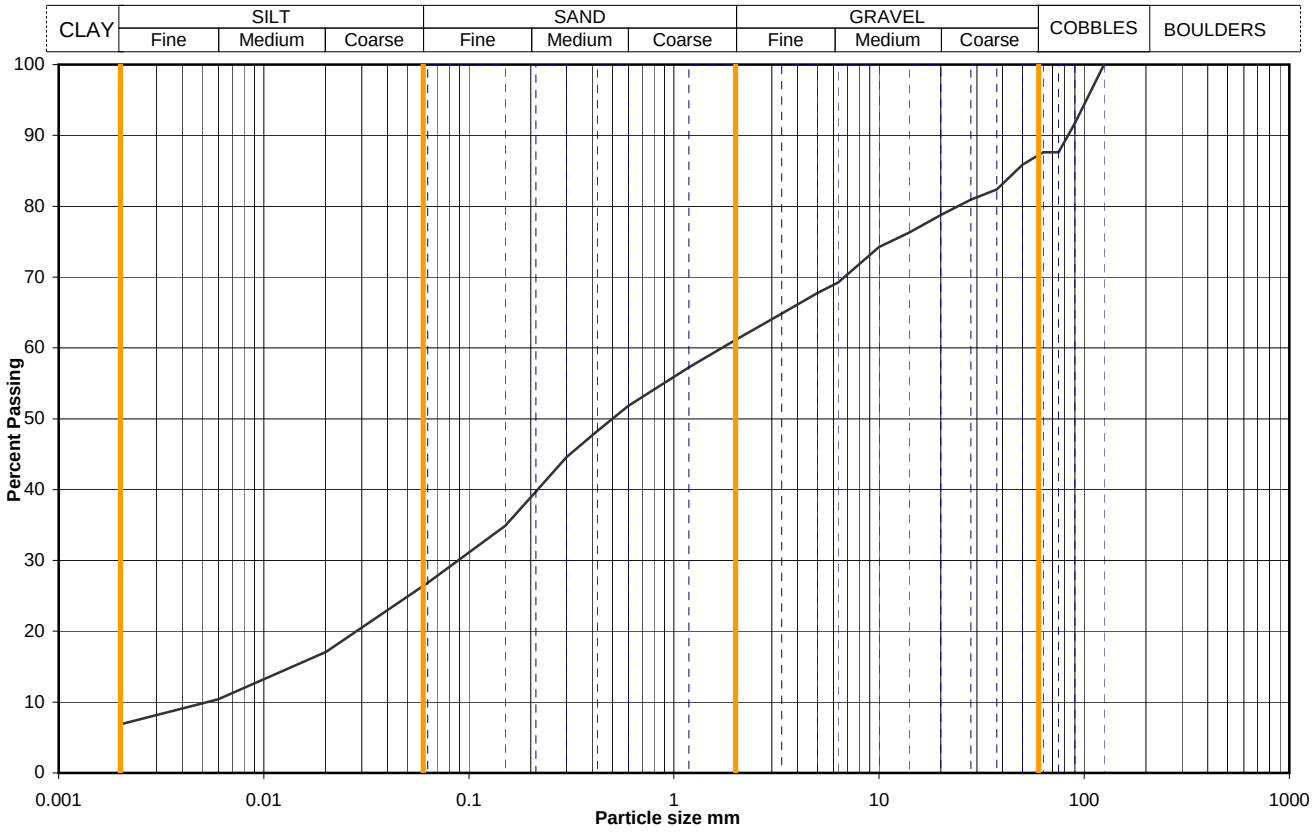
Soil description	Brown grey silty very sandy GRAVEL with low cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	2	0
	Gravel	53	54
	Sand	27	28
	Silt	15	15
	Clay	3	3

Uniformity Coefficient	D_{60} / D_{10}	468

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	TP3		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	1.20		
			Samp No	11	Type	B
			ID	ESGH807620080827000000140		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	17
90	92	0.0060	10
75	88	0.0020	7
63	88		
50	86		
37.5	82		
28	81		
20	79		
14	76		
10	74		
6.3	69		
5.0	68		
3.35	65		
2.00	61		
1.18	57	Particle density, Mg/m3	
0.600	52		
0.425	48	2.65 assumed	
0.300	45	Dry mass of sample, kg	
0.212	40		
0.150	35	18.8	
0.063	27		

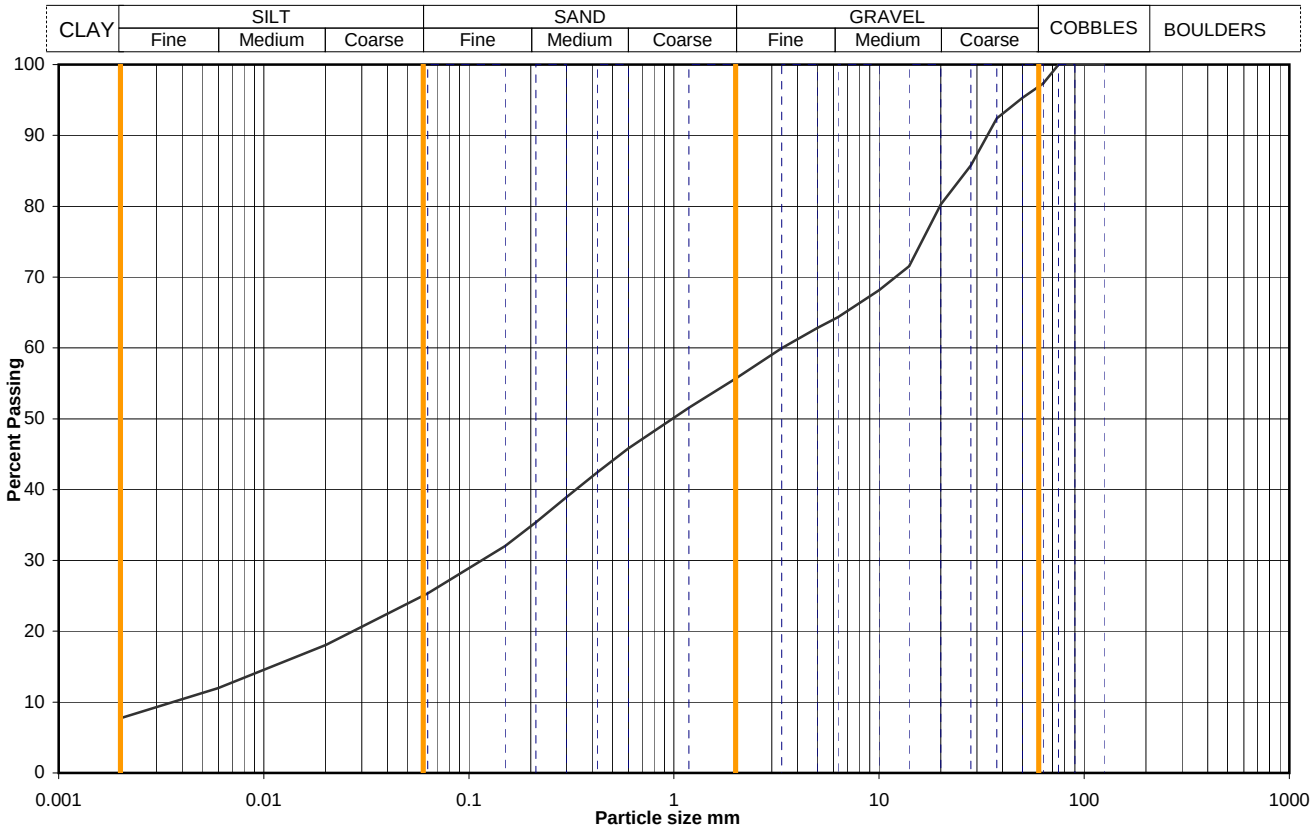
Soil description	Brown very silty very gravelly SAND with medium cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	13	0
	Gravel	26	30
	Sand	35	40
	Silt	19	22
	Clay	7	8

Uniformity Coefficient	D_{60} / D_{10}	323

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	TP5		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	1.20		
			Samp No	13	Type	B
			ID	ESGH807620080827000000166		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	18
90	100	0.0060	12
75	100	0.0020	8
63	97		
50	95		
37.5	92		
28	86		
20	80		
14	72		
10	68		
6.3	64		
5.0	63		
3.35	60		
2.00	56		
1.18	52	Particle density, Mg/m3	
0.600	46		
0.425	42	2.65 assumed	
0.300	39	Dry mass of sample, kg	
0.212	35		
0.150	32	12.0	
0.063	25		

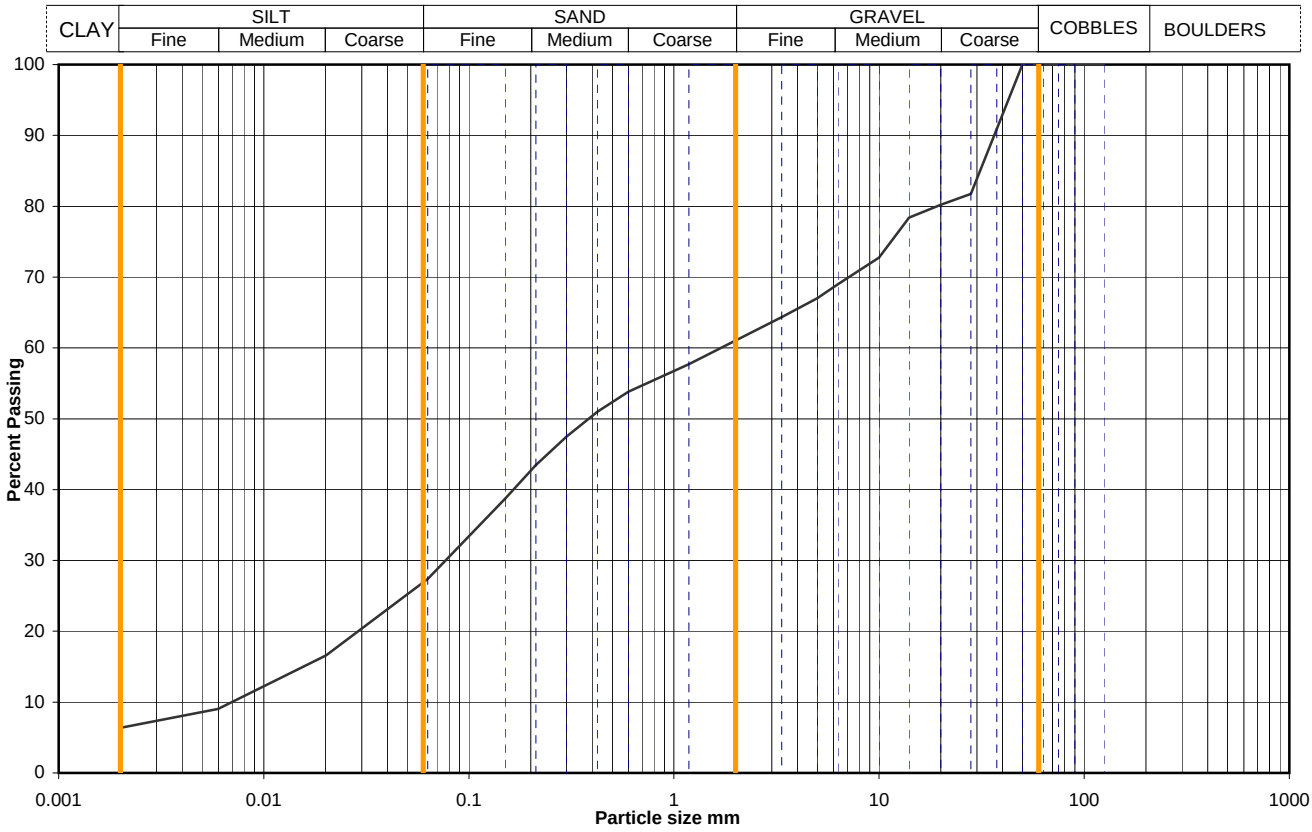
Soil description	Grey brown very silty very sandy GRAVEL with low cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	3	0
	Gravel	41	42
	Sand	31	32
	Silt	17	18
	Clay	8	8

Uniformity Coefficient	D_{60} / D_{10}	940

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	TP7		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	2.20		
			Samp No	10	Type	D
			ID	ESGH807620080827000000020l		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	17
90	100	0.0060	9
75	100	0.0020	6
63	100		
50	100		
37.5	91		
28	82		
20	80		
14	78		
10	73		
6.3	69		
5.0	67		
3.35	64		
2.00	61		
1.18	58	Particle density, Mg/m3	
0.600	54		
0.425	51	2.65 assumed	
0.300	48	Dry mass of sample, kg	
0.212	43		
0.150	39	1.5	
0.063	27		

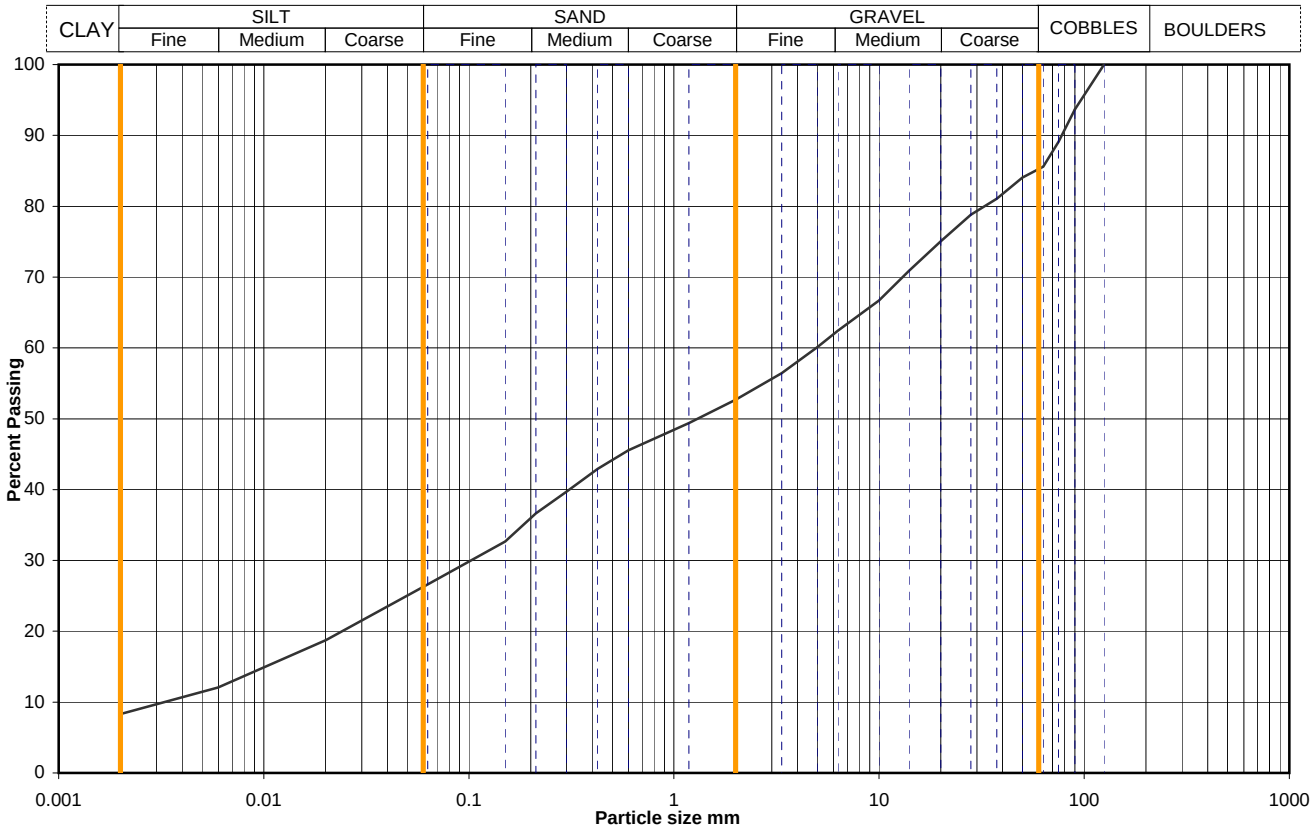
Soil description	Grey brown very silty very sandy GRAVEL		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	39	39
	Sand	34	34
	Silt	21	21
	Clay	6	6

Uniformity Coefficient	D_{60} / D_{10}	242

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	TP8		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	1.50		
			Samp No	13	Type	B
			ID	ESGH807620080827000000218		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	19
90	94	0.0060	12
75	89	0.0020	8
63	86		
50	84		
37.5	81		
28	79		
20	75		
14	71		
10	67		
6.3	62		
5.0	60		
3.35	56		
2.00	53		
1.18	49	Particle density, Mg/m3	
0.600	46		
0.425	43	2.65 assumed	
0.300	40	Dry mass of sample, kg	
0.212	37		
0.150	33	18.3	
0.063	27		

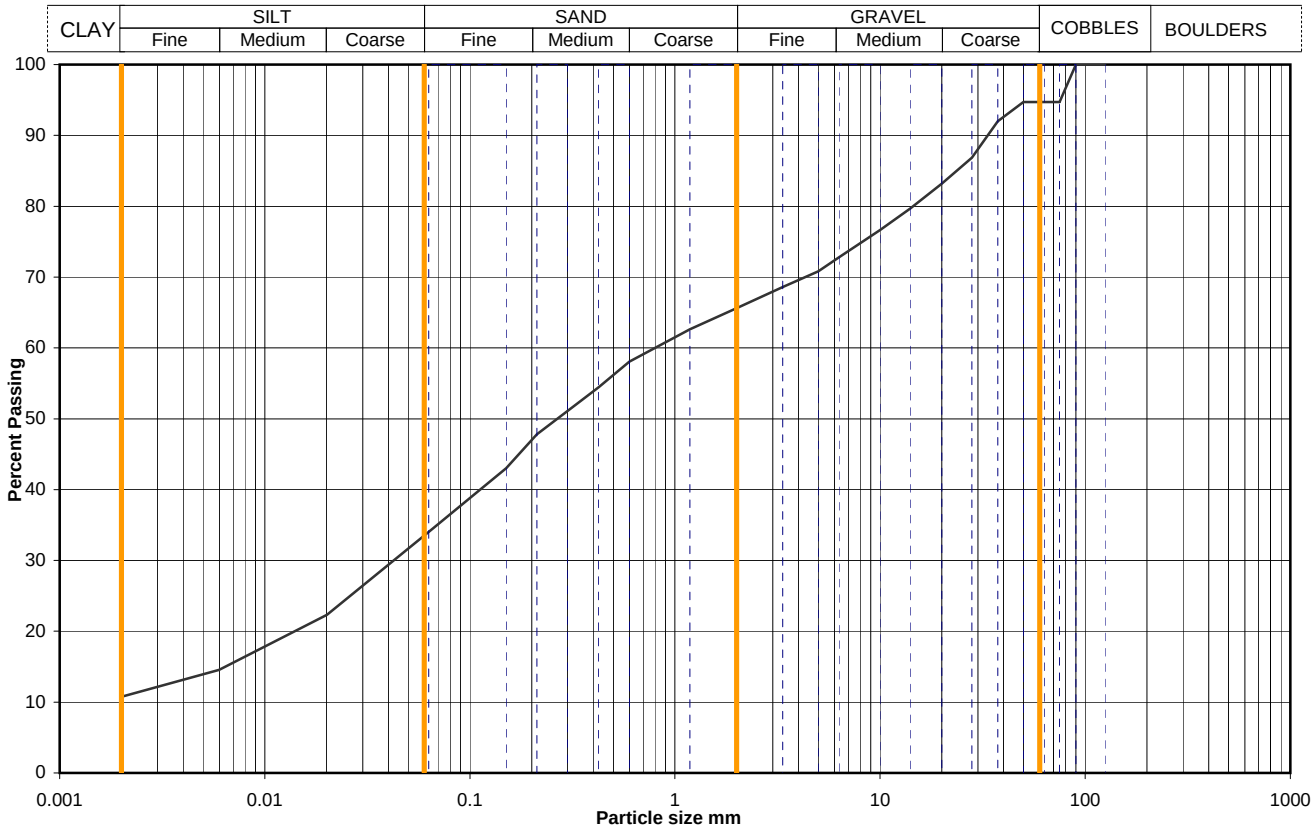
Soil description	Brown very silty very sandy GRAVEL with medium cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	15	0
	Gravel	32	38
	Sand	26	31
	Silt	18	21
	Clay	9	11

Uniformity Coefficient	D_{60} / D_{10}	1508

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

Particle Size Distribution Analysis

Project No	H8076	Sample Details:	Hole No	TP9		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	0.70		
			Samp No	12	Type	B
			ID	ESGH807620080827000000227		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0201	22
90	100	0.0060	15
75	95	0.0020	11
63	95		
50	95		
37.5	92		
28	87		
20	83		
14	80		
10	77		
6.3	73		
5.0	71		
3.35	69		
2.00	66		
1.18	63	Particle density, Mg/m3	
0.600	58		
0.425	54	2.65 assumed	
0.300	51	Dry mass of sample, kg	
0.212	48		
0.150	43	11.6	
0.063	34		

Soil description	Brown slightly gravelly slightly sandy SILT with low cobble content		
Preparation / Pretreatment	Sieve: pre dried, Pipette: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	5	0
	Gravel	29	31
	Sand	32	34
	Silt	23	24
	Clay	11	12

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.4 pipette

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITHOUT MEASUREMENT OF PORE PRESSURE - SUMMARY OF RESULTS

Project No	Project Name
H8076	Hirwaun Industrial Estate

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk Mg/m³	Density dry Mg/m³	*w* %	Test type	Dia. mm	$ó_3$ kPa	At failure / end of stage: Axial strain %	$ó_1 - ó_3$ kPa	c_u kPa	MODE	Remarks
BH103	9	3.00	3.50	U	Soft brown sandy CLAY	1.76	1.34	31	UU	104.7	60	7.1	48	24	P	

General notes: Tests carried out in accordance with BS1377: Part 7: 1990, clause 8 for single stage, clause 9 for multistage tests. Specimens nominally 2:1 height diameter ratio and tested at a rate of strain of 2%/minute, unless annotated otherwise. See individual test reports for further details.

Legend					
	UU - single stage test (may be in sets of specimens)	$ó_3$	cell pressure	Mode of failure	P plastic
	UUM - multistage test on a single specimen	$ó_1 - ó_3$	deviator stress		B brittle
	suffix R - remoulded or recompacted	c_u	undrained shear strength		C compound

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK - SUMMARY OF RESULTS

Project No	Project Name
H8076	Hirwaun Industrial Estate

Hole No.	Sample				Rock Type	Specimen Dimensions[2]			Bulk Density[2]	Water Content[1]	Uniaxial Compression[3]				Remarks
	No.	Depth (m)		type		Dia.	Height	H/D			Load Rate	Time to failure	Mode of failure	UCS	
		from	to			mm	mm		Mg/m^3	%	kN/min	secs		MPa	
BH101R	4	16.71		C	SILTSTONE	72.0	178.0	2.5	2.66	1.1	42	405	AC	70.0	Sample below required test size.
BH105R	3	13.00	14.50	C	SANDSTONE	72.0	175.0	2.4	2.64	0.4	42	808	MS	141.0	Sample below required test size.
BH108R	2	11.00	12.00	C	SANDSTONE	72.0	196.0	2.7	2.62	0.6	42	978	AC	168.0	sample taken at 11.34m

Notes : Test Specification : International Society for Rock Mechanics (ISRM), Rock Characterization Testing and Monitoring, Suggested Methods, 1981

1 ISRM p83 test 1, water content at 105 ± 3 ^{o}C, specimen as received at the laboratory

2 ISRM p83 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p113 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

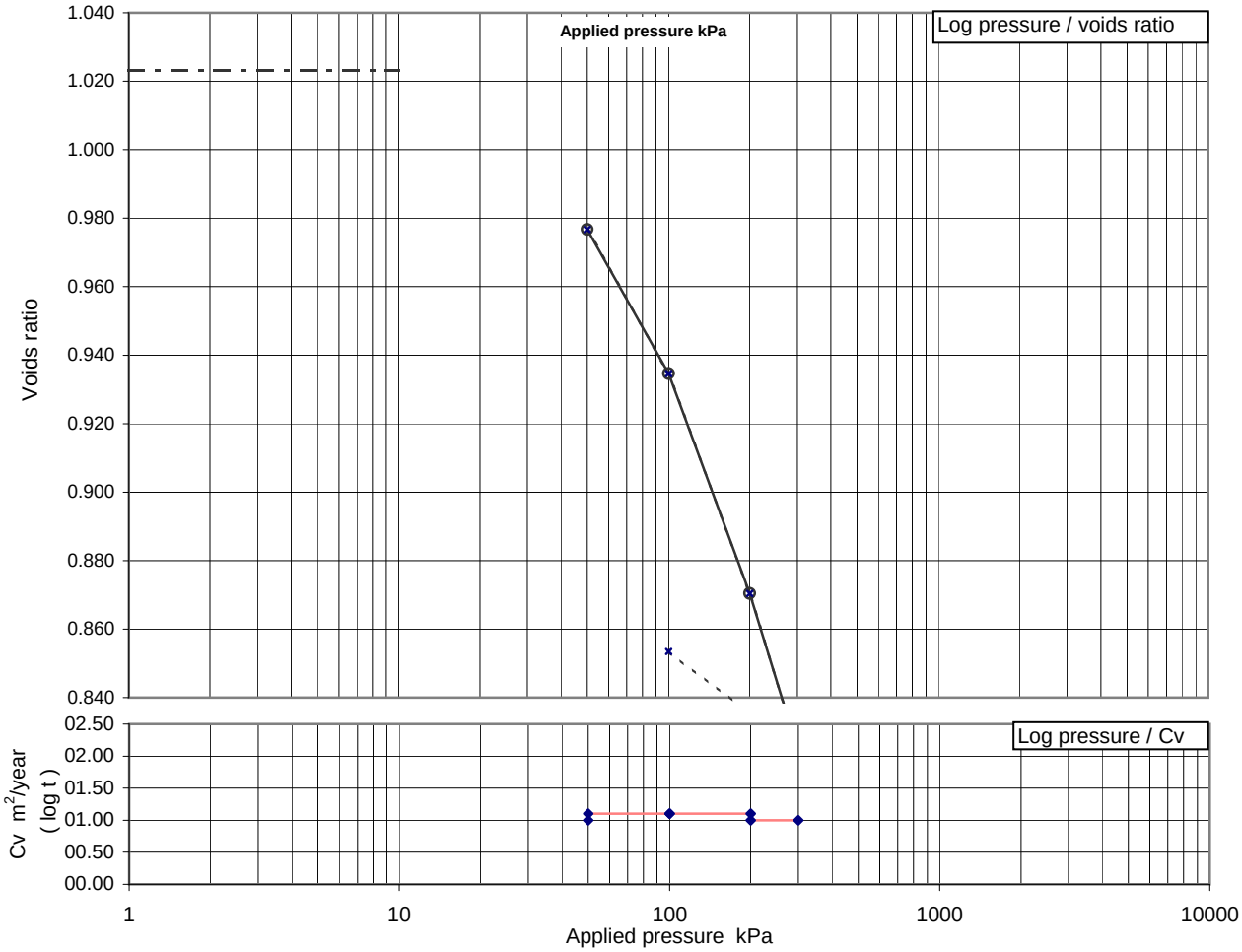
Mode of failure :

S - Single shear MS - multiple shear

AC - Axial cleavage F - Fragmented

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Project No	H8076	Sample Details:	Hole No	BH103		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	3.00		
			Samp No	9	Type	U
			ID	ESGH807620080916000000274		
			Spec Ref			



Soil description	Soft brown sandy CLAY	Liquid limit %	
Preparation	Undisturbed	Plastic limit %	

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m^3
Diameter	74.66		mm
Height	18.80	17.22	mm
Voids ratio	1.023	0.853	
Moisture content	40	34	%
Bulk density	1.83	1.91	Mg/m^3
Dry density	1.31	1.43	Mg/m^3
Saturation	103	105	%
Average temperature for test	20		°C

Swelling pressure: not measured kPa

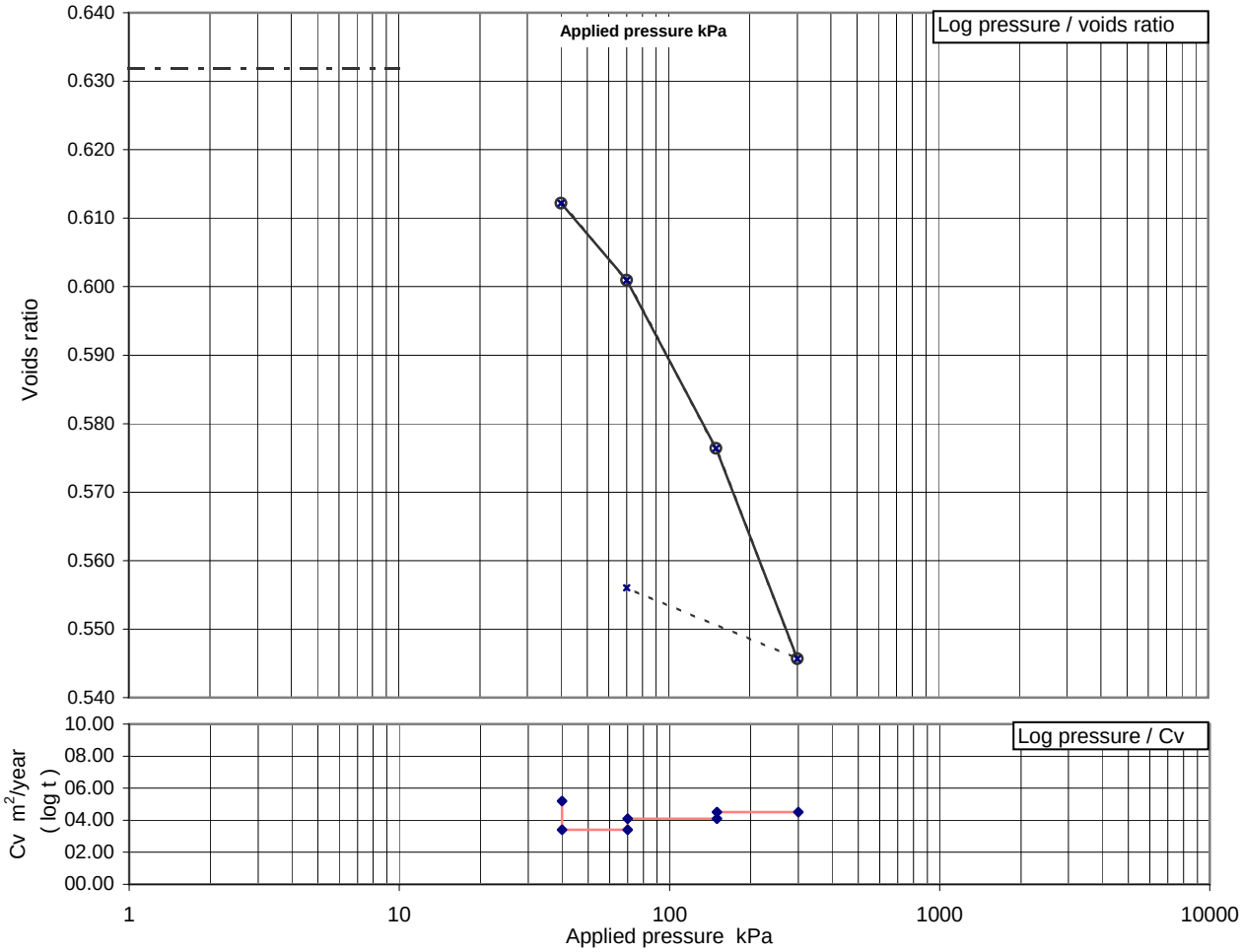
Notes :

Specimen taken 0 mm from base of sample

Applied Pressure kPa	Voids ratio	M_v m^2/MN	C_v ($t_{50, log}$) m^2/year	C_v ($t_{90, root}$) m^2/year	
0	1.0231				
50	0.9767	0.459	1	1.6	
100	0.9346	0.426	1.1	1.9	
200	0.8704	0.332	1.1	1.7	
300	0.8252	0.242	1	1.7	
100	0.8535	0.078	1.7	2.9	

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Project No	H8076	Sample Details:	Hole No	BH104		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	3.00		
			Samp No	8	Type	U
			ID	ESGH807620080916000000293		
			Spec Ref			



Soil description	Brown sandy CLAY	Liquid limit %	
Preparation	Undisturbed	Plastic limit %	

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m³
Diameter	74.64		mm
Height	18.75	17.88	mm
Voids ratio	0.632	0.556	
Moisture content	24	22	%
Bulk density	2.01	2.08	Mg/m³
Dry density	1.62	1.70	Mg/m³
Saturation	101	105	%
Average temperature for test	20		°C

Swelling pressure: not measured kPa

Notes :

Specimen taken 0 mm from base of sample

Applied Pressure kPa	Voids ratio	M_v m²/MN	C_v ($t_{50, log}$) m²/year	C_v ($t_{90, root}$) m²/year	
0	0.6318				
40	0.6122	0.301	5.2	16	
70	0.6009	0.232	3.4	13	
150	0.5764	0.192	4.1	6.2	
300	0.5457	0.130	4.5	8.8	
70	0.5560	0.029	5.1	9	

CHEMICAL TESTS - SUMMARY OF RESULTS

Project No	Project Name
H8076	Hirwaun Industrial Estate

Hole No.	Sample				Soil Description	pH	Org	LOI	Sulphate as SO_4			CO_2	Chloride, Cl		<2 mm	Remarks
	No.	Depth (m)		type					soil	2:1	water		water sol.	acid sol.		
		from	to				%	%	%	g/L	g/L	%	%	%	%	
BH101	11	5.00		B	Grey brown slightly sandy silty fine to coarse subrounded GRAVEL	8.3				0.04					54	
BH102	11	4.50	4.70	D	Grey brown slightly sandy CLAY	7.6				0.03					99	
BH103	14	5.00		B	Brown grey slightly sandy slightly gravelly CLAY	7.7				0.06					97	
BH104	12	5.00	5.45	B	Brown grey slightly gravelly CLAY	8.1				0.26					97	
BH105	11	5.00		B	Brown grey slightly clayey slightly sandy fine to coarse subangular	8.4				0.04					16	
BH106	6	2.00		B	Brown grey slightly gravelly slightly sandy SILT with low cobble content	4.9				0.03					80	
BH107	6	3.00	3.45	B	Brown grey slightly gravelly slightly sandy CLAY with low cobble content	8.1				0.03					74	
BH109	3	1.20	1.29	B	Brown grey slightly clayey very sandy fine to coarse subangular GRAVEL	8.9				0.04					30	
TP10	10	0.70		B	Grey brown slightly sandy slightly gravelly CLAY	8.8				0.10					81	
TP11	11	1.20		B	Grey brown slightly sandy slightly gravelly slightly organic CLAY	5.7				0.06					99	
TP11A	6	1.30		D	Brown grey gravelly clayey SAND	5.8				0.07					100	
TP12A	6	1.50		D	Brown grey sandy gravelly CLAY	5.2				0.04					77	
TP15	7	1.30		D	Brown slightly sandy slightly gravelly CLAY	5.3				0.05					84	
TP2	10	1.70		D	Grey brown slightly sandy slightly gravelly CLAY	8.0				0.04					72	
TP3	6	0.50		D	Grey brown slightly sandy slightly gravelly CLAY	7.9				0.02					86	
TP5	8	1.20		D	Grey brown slightly sandy slightly gravelly SILT	7.9				0.05					81	
TP5	9	2.00		D	Grey brown slightly sandy slightly gravelly CLAY	6.6				0.06					77	
TP6	10	1.60		D	Brown grey sandy gravelly SILT	5.5				0.05					78	
TP7	8	0.70		D	Grey brown slightly sandy slightly gravelly CLAY	8.0				0.06					75	
TP8	8	0.80		D	Grey brown slightly sandy slightly gravelly CLAY	7.3				0.06					87	
TP9	9	2.40		D	Brown grey slightly sandy gravelly CLAY	8.2				0.01					72	

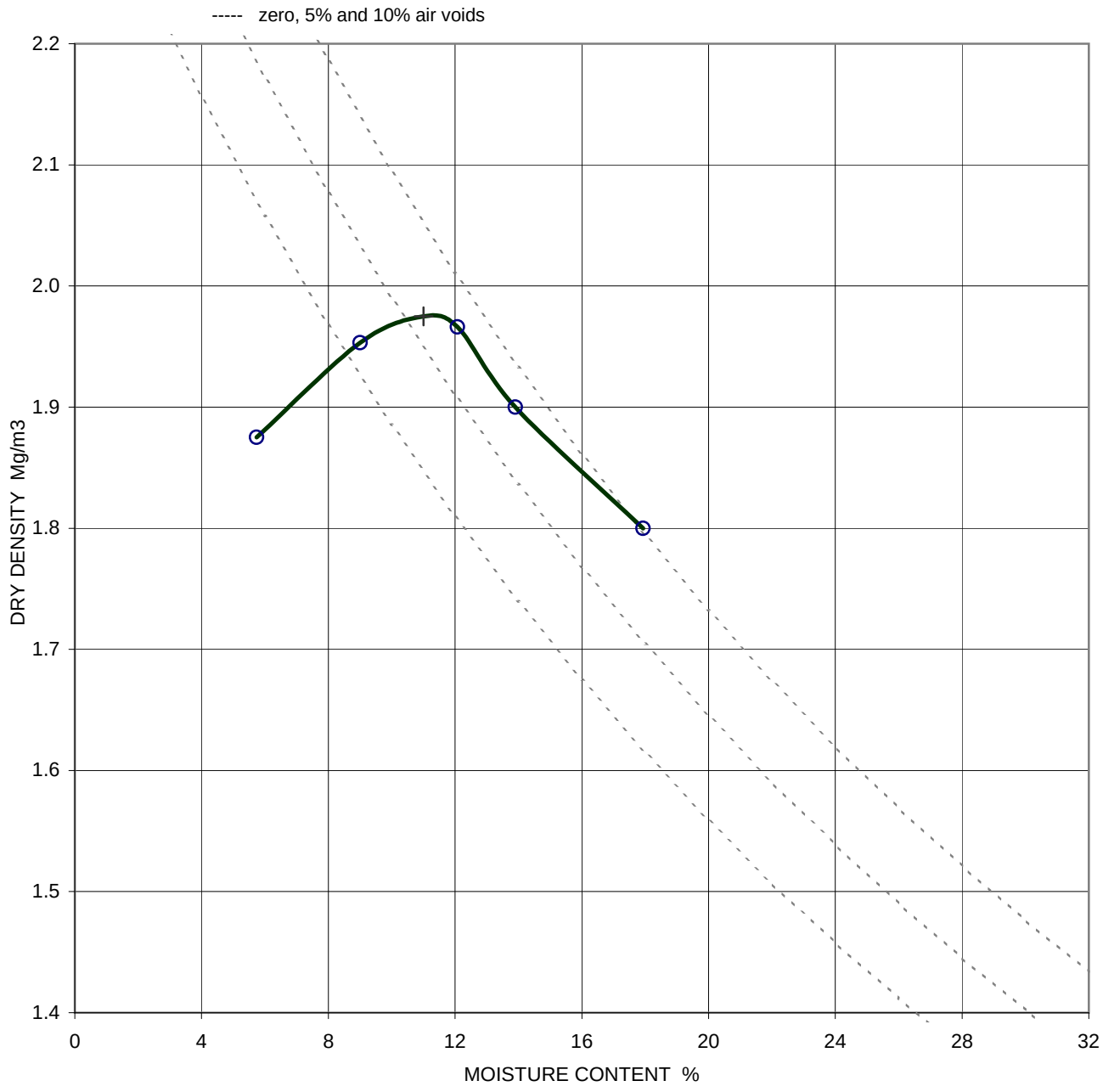
General notes: BS 1377:Part 3:1990 definitive method used in all cases unless annotated otherwise. See individual test reports for further details

Key : 2:1 2:1 water:soil extract from soil | Organic matter content | CO_2 Carbonate content (rapid titration)

< 2 mm material passing 2mm sieve | Mass loss on ignition

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Project No	H8076	Sample Details:	Hole No	TP12A		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	0.20		
			Samp No	7	Type	B
			ID	ESGH807620080827000000046		
			Spec Ref			



Soil description	Brown grey slightly sandy gravelly CLAY		
Test method	BS 1377:part 4:1990: clause 3.4, 2.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	16	%	
Material < 37.5mm > 20mm	11	%	
Particle density, Mg/m^3	2.65	assumed	
Remarks	X' Material tested at clients request.		

Derived Parameters +

Maximum dry density, Mg/m3

1.98

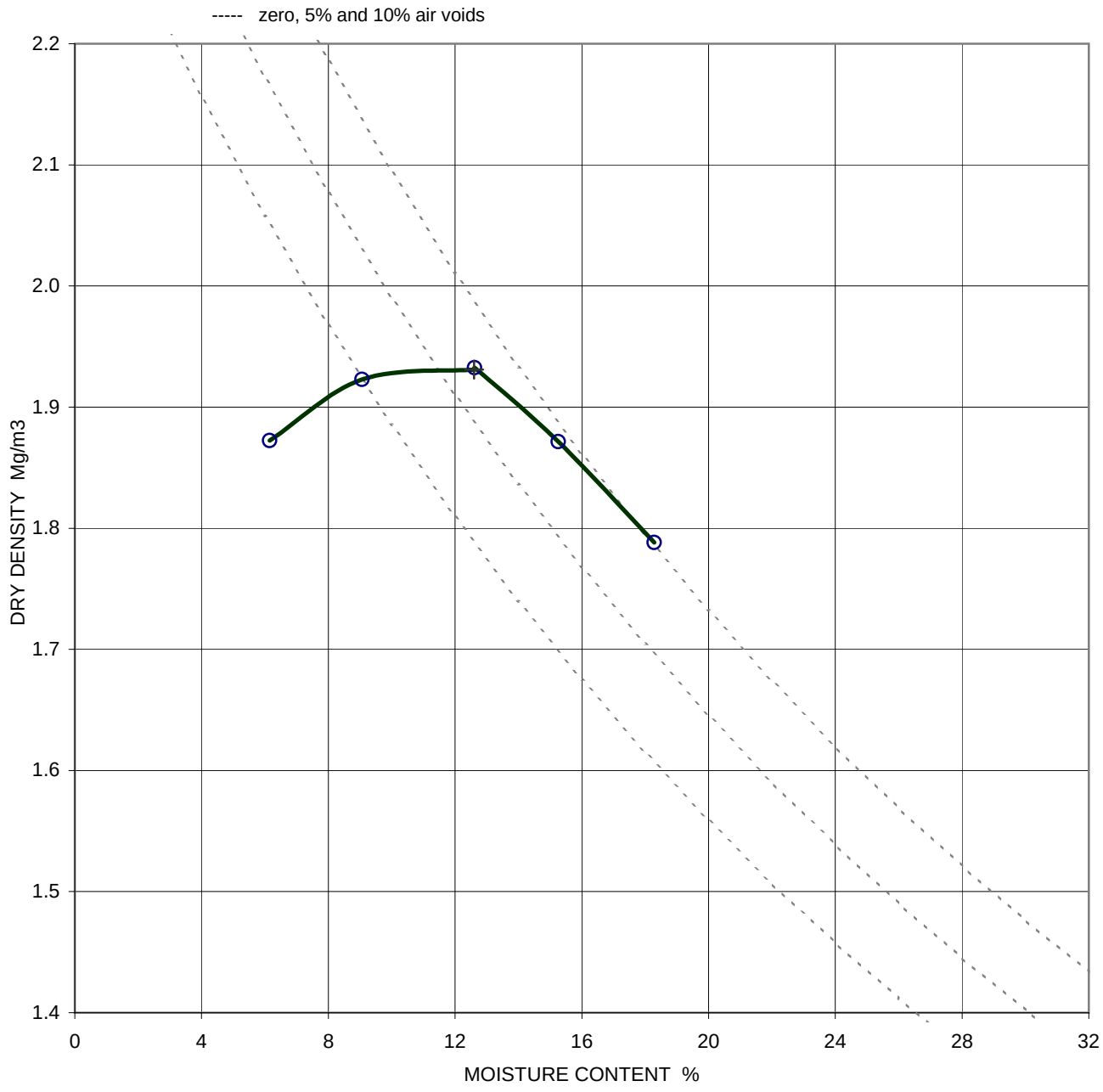
Optimum moisture content, %

11

QA Ref SLD 4, 3.3/4 Rev 62 Jul 07	Soil Mechanics	UKAS TESTING 4089	Printed:27/10/2008 14:32	**Figure** **COMPL 1**

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : LIGHT COMPACTION, 2.5 kg rammer

Project No	H8076	Sample Details:	Hole No	TP15		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	0.30		
			Samp No	9	Type	B
			ID	ESGH807620080827000000067		
			Spec Ref			



Soil description	Grey brown slightly sandy gravelly CLAY		
Test method	BS 1377:part 4:1990: clause 3.4, 2.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	13	%	
Material < 37.5mm > 20mm	13	%	
Particle density, Mg/m^3	2.65	assumed	
Remarks	X' Material tested at clients request		

Derived Parameters +

Maximum dry density, Mg/m3

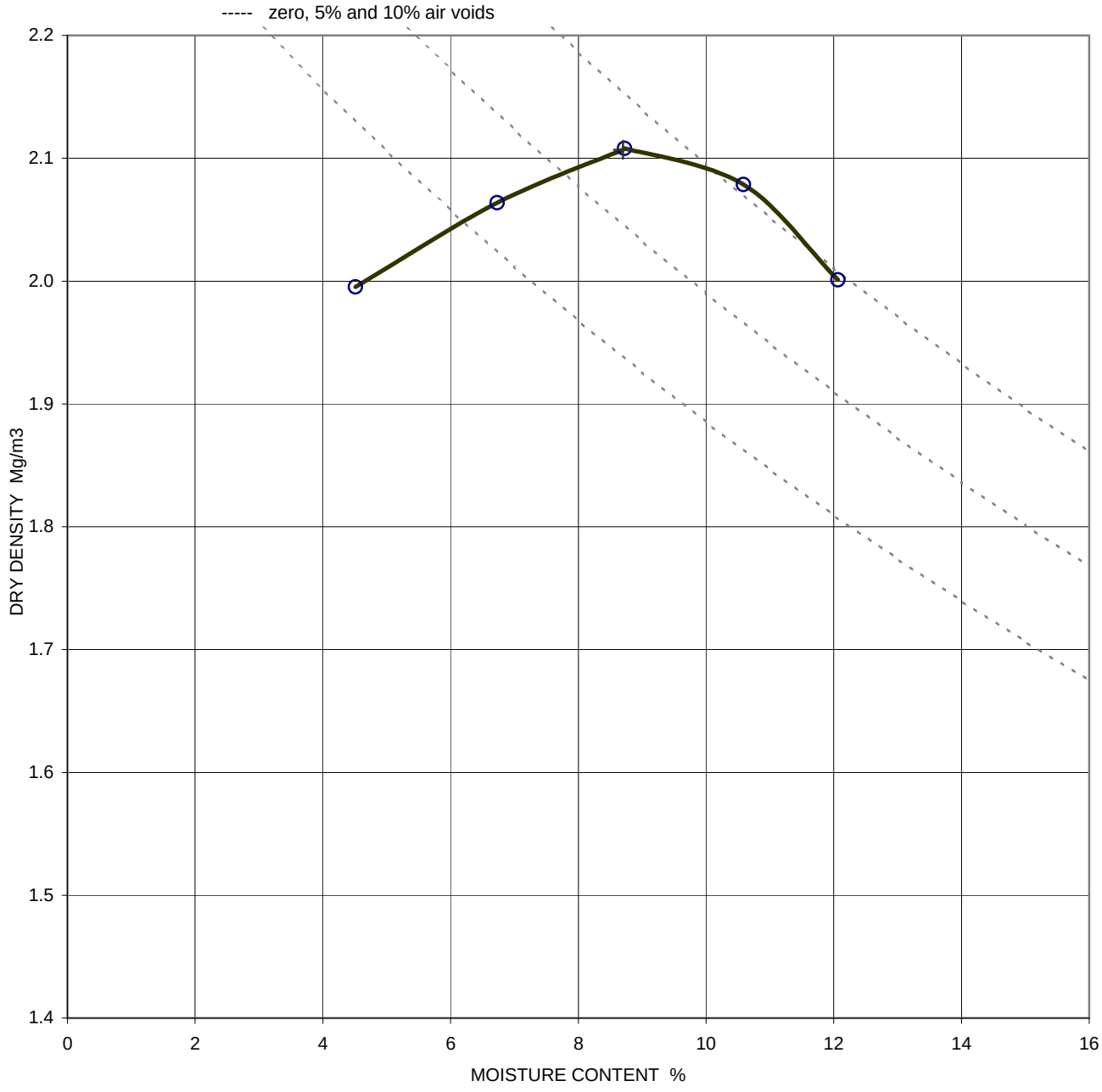
1.93

Optimum moisture content, %

13

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Project No	H8076	Sample Details:	Hole No	TP3		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	0.50		
			Samp No	10	Type	B
			ID	ESGH807620080827000000137		
			Spec Ref			



Soil description	Grey brown slightly sandy slightly gravelly CLAY		
Test method	BS 1377:part 4:1990: clause 3.6, 4.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	5	%	
Material < 37.5mm > 20mm	4	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3

2.11

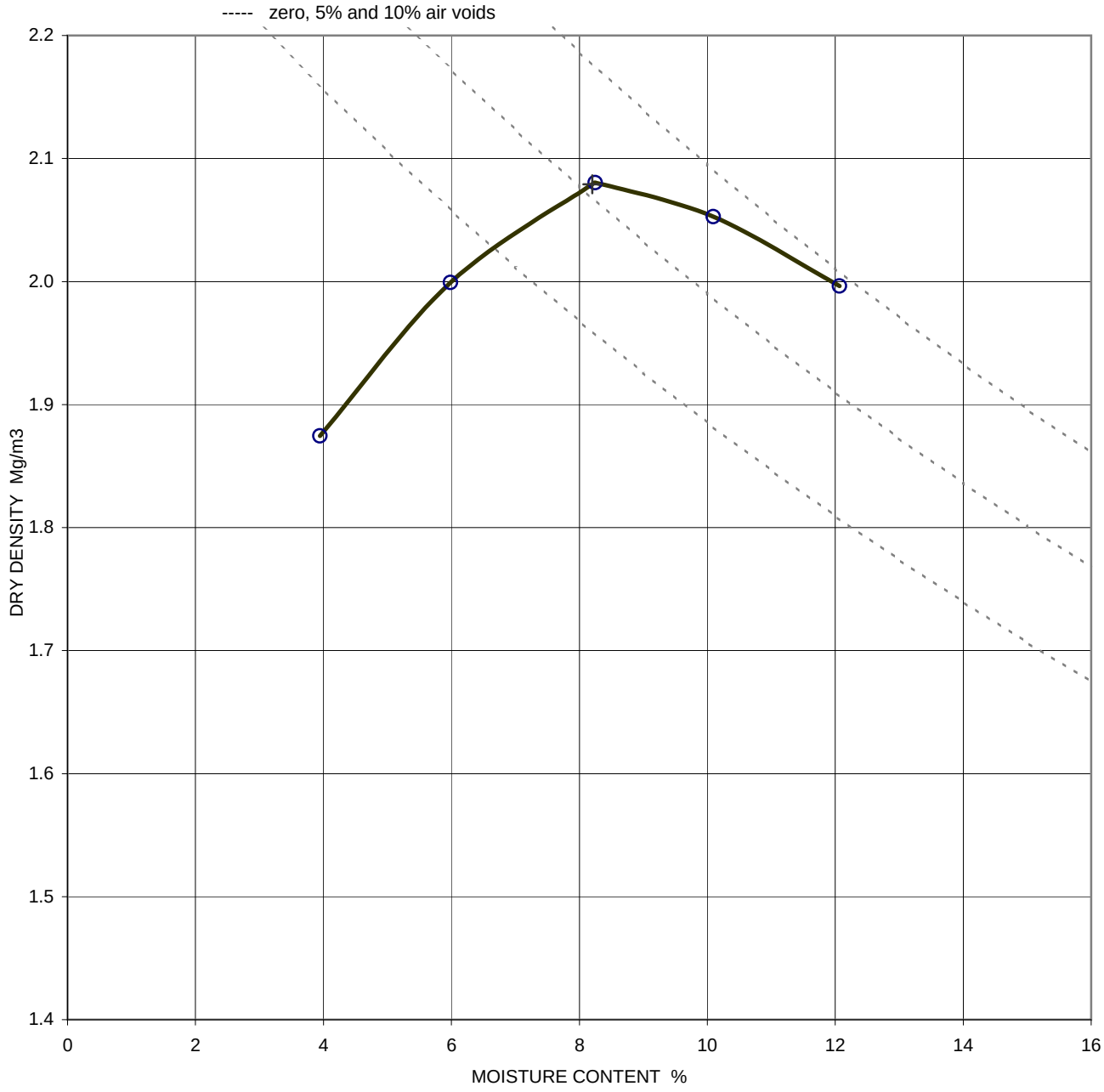
Optimum moisture content, %

8.7

QA Ref SLD 4, 3.5/6 Rev 62 Jul 07	Soil Mechanics	UKAS TESTING 4089	Printed:27/10/2008 14:31	**Figure** **COMPH 1**

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Project No	H8076	Sample Details:	Hole No	TP6		
Project Name	Hirwaun Industrial Estate		Depth (m BGL)	0.90		
			Samp No	14	Type	B
			ID	ESGH807620080827000000180		
			Spec Ref			



Soil description	Brown grey gravelly sandy CLAY		
Test method	BS 1377:part 4:1990: clause 3.6, 4.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	18	%	
Material < 37.5mm > 20mm	7	%	
Particle density	2.65	assumed	
Remarks	X' Material tested at clients request		

Derived Parameters +

Maximum dry density, Mg/m3

2.08

Optimum moisture content, %

8.2

QA Ref SLD 4, 3.5/6 Rev 62 Jul 07	Soil Mechanics	UKAS TESTING 4089	Printed:27/10/2008 14:31	**Figure** **COMPH 2**

ENCLOSURE D

GEOENVIRONMENTAL LABORATORY TEST RESULTS

TES Report	TES Report no
	EFS/086407M (ver2)
	EFS/086384M
	EFS/086382M
	EFS/085713M
	EXR/088900

TEST REPORT
SOIL SAMPLE ANALYSIS

1252

Amended Report
TES Report No. EFS/086407M (Ver. 2)

Soil Mechanics
Unit 15
Crosby Yard
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Hirwaun Industrial Estate

The 16 samples described in this report were logged for analysis by TES Bretby on 06-Oct-2008.This is an amended report that replaces the report issued on 22-Oct-2008
The analysis was completed by: 05-Nov-2008

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

On behalf of
TES Bretby :
Jane Colbourne

JNColbourne
Project Co-ordinator

Date of Issue: 05-Nov-2008

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Sample Descriptions

Client : Soil Mechanics

Site : Hirwaun Industrial Estate

Report Number : S08_6407M

Lab ID Number	Client ID	Description
CL/0829481	TP1A ES 1 0.30	Brown Gravel SILT
CL/0829482	TP1A ES 3 1.50	Brown SILT
CL/0829483	TP2 ES 1 0.30	Brown SILT
CL/0829484	TP2 ES 5 2.70	Brown SILT
CL/0829485	TP2 ES 6 3.30	Brown CLAY
CL/0829486	TP3 ES 2 0.50	Brown Gravel SILT
CL/0829487	TP4 ES 2 0.70	Brown SILT
CL/0829488	TP5 ES 1 0.30	Brown SILT
CL/0829489	TP6 ES 1 0.30	Brown Gravel CLAY
CL/0829490	TP7 ES 1 0.30	Brown Gravel SILT
CL/0829491	TP8 ES 1 0.30	Brown Gravel CLAY
CL/0829492	TP8 ES 3 0.80	Brown Gravel SILT
CL/0829493	TP9 ES 2 0.70	Brown SILT
CL/0829494	TP10 ES 1 0.30	Brown SILT
CL/0829495	TP10 ES 2 0.70	Brown SILT
CL/0829496	TP11 ES 2 1.60	Brown SILT

Units :		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg
Method Codes :		ELESULP	ICPACIDS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	TMSS	TPHFIDUS	TPHFIDUS
Method Reporting Limits :		20	20	0.1	2	0.1	3	3	3.5	0.10	0.5	2.5	0.5	19.5	0.2	10.0	10.0
Accreditation Code:		UM	UM	U	UM	U	UM	UM	UM	U	U	UM	U	UM	U	UM	
TES ID Number CL/	**Client Sample Description**	**Elemental Sulphur**	**SO4-- (acid sol)**	**Antimony (MS)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Molybdenum (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**
0829481	TP1A ES 1 0.30	<20	72	<0.5	6.7	0.22	11.6‡	13	18.9	<0.1	<0.5	18.5	<0.5	47.8	10.5	25	Req
0829482	TP1A ES 3 1.50	<20	55	<0.5	5.8	0.19	10.6‡	11.4	14.9	<0.1	<0.5	18.2	<0.5	42	10.6	34	Req
0829483	TP2 ES 1 0.30	<20	<20	<0.5	5.1	0.17	7.8‡	9.7	11.9	<0.1	<0.5	12.1	<0.5	30.9	7.3	1000	Req
0829484	TP2 ES 5 2.70	968	690	1.7	17.9	0.42	14‡	14.1	30.3	0.12	1.4	12.4	0.7	203.1	30.8	611	Req
0829485	TP2 ES 6 3.30	36	318	<0.5	6.4	<0.1	19.6‡	4.9	25.6	0.12	<0.5	8.6	0.9	58.8	45.5	222	Req
0829486	TP3 ES 2 0.50	<20	<20	<0.5	6.1	0.2	11.3‡	19.4	13.4	<0.1	<0.5	18	<0.5	41.5	9.5	<11.0	Req
0829487	TP4 ES 2 0.70	<20	<20	<0.5	4.9	0.19	7.7‡	24.8	9.5	<0.1	<0.5	12.6	<0.5	66.2	9.6	44	Req
0829488	TP5 ES 1 0.30	<20	<20	<0.5	6.3	0.19	11.0‡	15.1	15.9	<0.1	<0.5	17.1	<0.5	47.5	10.2	15.6	Req
0829489	TP6 ES 1 0.30	<21	<21	<0.5	7	0.22	11.1‡	12.8	14.1	<0.1	0.5	18	<0.5	52.6	15.5	33	Req
0829490	TP7 ES 1 0.30	<20	<20	<0.5	6.4	0.22	10.8‡	13.5	15.7	<0.1	<0.5	17.6	<0.5	39.3	11.2	23	Req
0829491	TP8 ES 1 0.30	<21	<21	<0.5	7.1	0.27	10.2‡	28.3	15	<0.1	<0.5	18.8	<0.5	72.1	14.1	<11.6	Req
0829492	TP8 ES 3 0.80	<20	<20	<0.5	7.7	0.18	10.7‡	12.7	15.1	<0.1	<0.5	13.3	<0.5	56.4	11.3	19	Req
0829493	TP9 ES 2 0.70	<21	<21	<0.5	5.3	0.14	9.9‡	10.5	11.7	<0.1	<0.5	13.5	<0.5	30.1	10.7	<11.2	Req
0829494	TP10 ES 1 0.30	<20	<20	1	6.4	0.21	9.4‡	14.7	29.2	<0.1	<0.5	15.3	<0.5	56.6	11.3	13.5	Req
0829495	TP10 ES 2 0.70	13	495	1.4	7.8	2.01	14.9‡	187.2	52.1	0.22	1.1	18.6	<0.5	1220	11.4	444	Req
0829496	TP11 ES 2 1.60	22	470	0.6	27.8	0.77	18.4‡	14	39.2	<0.1	1.2	10.7	1.1	148	31.1	118	Req

TES Bretby

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Amended Report

Date Printed	05-Nov-08
Report Number	**EFS/086407M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :		pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% M/M		
Method Codes :		WSLM3	ICPBOR	ICPMAJ	KONECL	KONECR	PAHSCUV	PCBUSECD	SEN9	SFAPI	SFAPI	SFAPI	SFAPI	SFAS	WSLM59		
Method Reporting Limits :			0.5	1	5.0	0.1	10			0.5	0.5	0.5	2	0.5	0.02		
Accreditation Code:		U	N	N	N	N	N		N	N	N	N	N	N	N		
TES ID Number CL/	**Client Sample Description**	**pH units**	**Boron (H20 Soluble)**	**Barium**	**Chloride:**	**Chromium vi:**	**PAH (screening)**	**PCB (12 Congeners)**	**Asbestos (screening)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Thiocyanate(SCN)(AR)**	**Sulphide as S (AR)**	**F.O.C. %**		
0829481	TP1A ES 1 0.30	7.9	3.4	115	10.1	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.2	<0.6	1.15		
0829482	TP1A ES 3 1.50	8.0	3.2	120	9.2	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.2	<0.6	0.76		
0829483	TP2 ES 1 0.30	7.3	3.1	38	21	<0.1	<10		NBFO	<0.5	<0.5	<0.5	<2.2	<0.5	0.38		
0829484	TP2 ES 5 2.70	9.0	4.1	104	96	<0.1	227		NBFO	<0.7	<0.7	<0.7	<2.9	15.6	2.9		
0829485	TP2 ES 6 3.30	7.1	3.8	116	70	<0.1	<11		NBFO	<0.9	<0.9	<0.9	<3.7	1.5	5.08		
0829486	TP3 ES 2 0.50	8.0	3	142	47	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.2	<0.6	0.58		
0829487	TP4 ES 2 0.70	8.4	3.1	106	15.4	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.2	<0.6	0.56		
0829488	TP5 ES 1 0.30	8.2	3	123	13.3	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.2	<0.6	0.57		
0829489	TP6 ES 1 0.30	8.2	2.9	112	26	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	0.63		
0829490	TP7 ES 1 0.30	8.3	2.7	190	50	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.55		
0829491	TP8 ES 1 0.30	8.2	2.7	104	7.2	<0.1	<10	Req	NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.51		
0829492	TP8 ES 3 0.80	7.8	2.8	96	21	<0.1	<10	Req	NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.54		
0829493	TP9 ES 2 0.70	6.8	2.9	30	15.4	<0.1	<10	Req	NBFO	<0.6	<0.6	<0.6	<2.2	<0.6	0.29		
0829494	TP10 ES 1 0.30	7.9	2.6	78	12.2	<0.1	<10		NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.73		
0829495	TP10 ES 2 0.70	8.3	3	419	28	<0.1	36		NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	2.31		
0829496	TP11 ES 2 1.60	6.6	3.4	153	12.5	<0.1	<10		NBFO	<0.7	<0.7	<0.7	<2.9	<0.7	3.24		

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Amended Report

Date Printed	05-Nov-08
Report Number	**EFS/086407M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :		ug/kg	ug/kg	ug/kg	ug/kg												
Method Codes :		BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA												
Method Reporting Limits :		10	10	10	20												
Accreditation Code:		N	N	N	N												
TES ID Number CL/	**Client Sample Description**	**Benzene**	**Toluene**	**Ethyl Benzene**	**Xylenes**												
0829481	TP1A ES 1 0.30	<11	<11	<11	<22												
0829482	TP1A ES 3 1.50	<11	<11	<11	<22												
0829483	TP2 ES 1 0.30	<11	<11	<11	<22												
0829484	TP2 ES 5 2.70	<14	<14	<14	<29												
0829485	TP2 ES 6 3.30	<18	<18	<18	<37												
0829486	TP3 ES 2 0.50	<11	<11	<11	<22												
0829487	TP4 ES 2 0.70	<11	<11	<11	<22												
0829488	TP5 ES 1 0.30	<11	<11	<11	<22												
0829489	TP6 ES 1 0.30	<12	<12	<12	<24												
0829490	TP7 ES 1 0.30	<11	<11	<11	<23												
0829491	TP8 ES 1 0.30	<12	<12	<12	<23												
0829492	TP8 ES 3 0.80	<11	<11	<11	<23												
0829493	TP9 ES 2 0.70	<11	<11	<11	<22												
0829494	TP10 ES 1 0.30	<11	<11	<11	<23												
0829495	TP10 ES 2 0.70	<11	<11	<11	<23												
0829496	TP11 ES 2 1.60	<15	<15	<15	<29												

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Amended Report

Date Printed	05-Nov-08
Report Number	**EFS/086407M**
Table Number	**1**

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: Soil Mechanics: Hirwaun Industrial Estate
Job Number: S08_6407M
QC Batch Number: 083657
Directory: 1016PCB.GC11
Method: Ultrasonic
Accreditation code: N

Matrix: Soil
Date Booked in: 06-Oct-08
Date Extracted: 17-Oct-08
Date Analysed: 20-Oct-08

		Concentration, (µg/kg)											
Sample ID	**Customer ID**	**PCB 81**	**PCB 77**	**PCB 123**	**PCB 118**	**PCB 114**	**PCB 105**	**PCB 126**	**PCB 167**	**PCB 156**	**PCB 157**	**PCB 169**	**PCB 189**
* CL0829491	TP8 ES 1 0.30	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
* CL0829492	TP8 ES 3 0.80	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
* CL0829493	TP9 ES 2 0.70	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

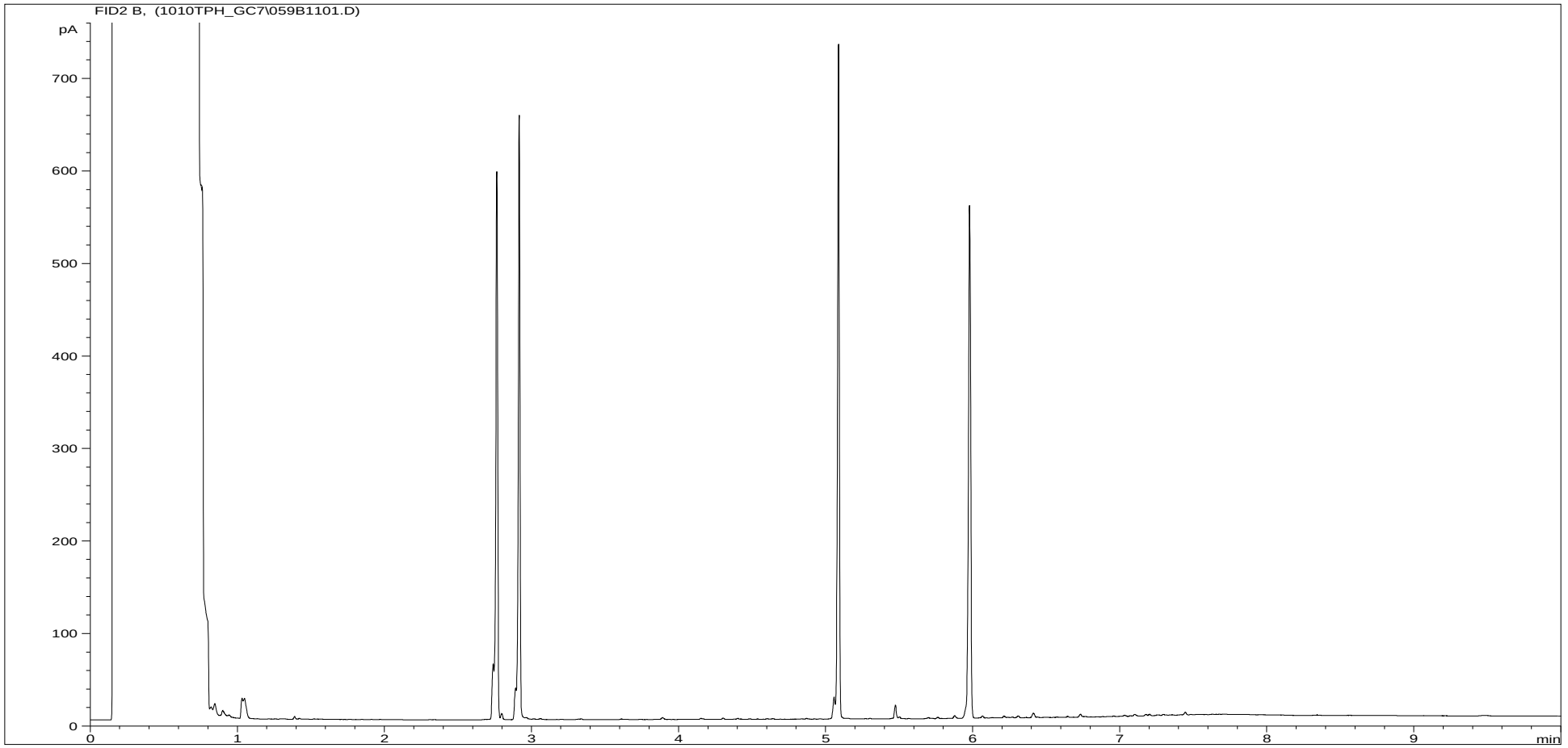
Customer and Site Details: Soil Mechanics : Hirwaun Industrial Estate
Job Number: S08_6407M
QC Batch Number: 83558
Directory: D:\TES\DATA\Y2008\1010TPH_GC7\074B2801.D
Method: Ultra Sonic
Accreditation code: U

Matrix: Soil
Date Booked in: 06-Oct-08
Date Extracted: 09-Oct-08
Date Analysed: 10-Oct-08

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL0829481	TP1A ES 1 0.30	<2	<2	<2	<2	15
CL0829482	TP1A ES 3 1.50	<2	<2	2.37	2.86	21.5
CL0829483	TP2 ES 1 0.30	<2	<2	17.6	148	727
CL0829484	TP2 ES 5 2.70	4.73	29.9	198	223	136.7
CL0829485	TP2 ES 6 3.30	<4	<4	<4	4.17	141.1
CL0829486	TP3 ES 2 0.50	<2	<2	<2	<2	<4.84
CL0829487	TP4 ES 2 0.70	<2	<2	2.75	8.76	25.8
CL0829488	TP5 ES 1 0.30	<2	<2	<2	<2	10.5
CL0829489	TP6 ES 1 0.30	<2	<2	4.18	3.57	17
CL0829490	TP7 ES 1 0.30	<2	<2	<2	<2	14
CL0829491	TP8 ES 1 0.30	<2	<2	<2	<2	5.8
CL0829492	TP8 ES 3 0.80	<2	<2	<2	<2	13
CL0829493	TP9 ES 2 0.70	<2	<2	<2	<2	<4.90
CL0829494	TP10 ES 1 0.30	<2	<2	<2	<2	8.62
CL0829495	TP10 ES 2 0.70	<2	<2	5.79	68	314
CL0829496	TP11 ES 2 1.60	<3	<3	2.98	15.7	79.5

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appropriat e, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

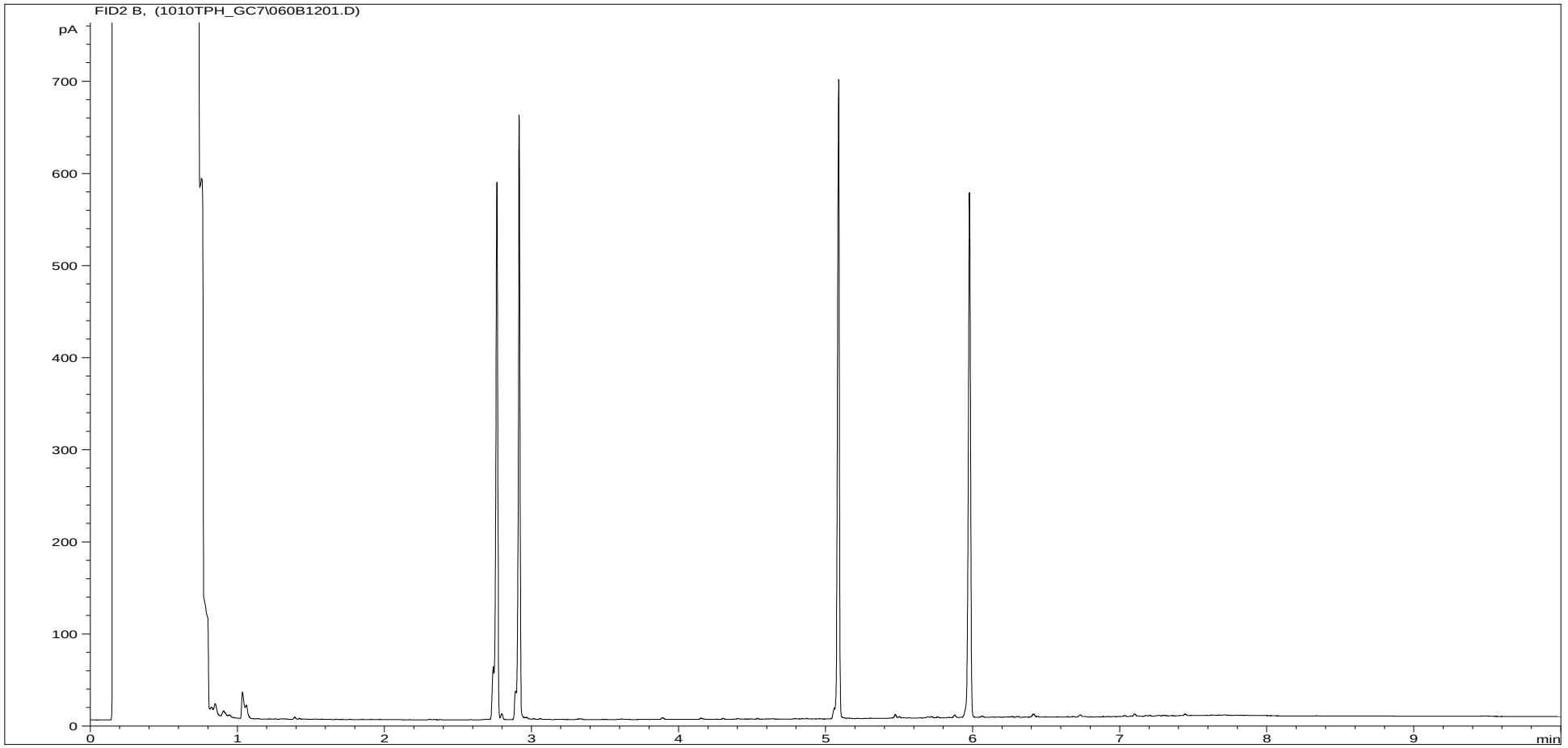


Sample ID:	CL0829481	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP1A ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\059B1101.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

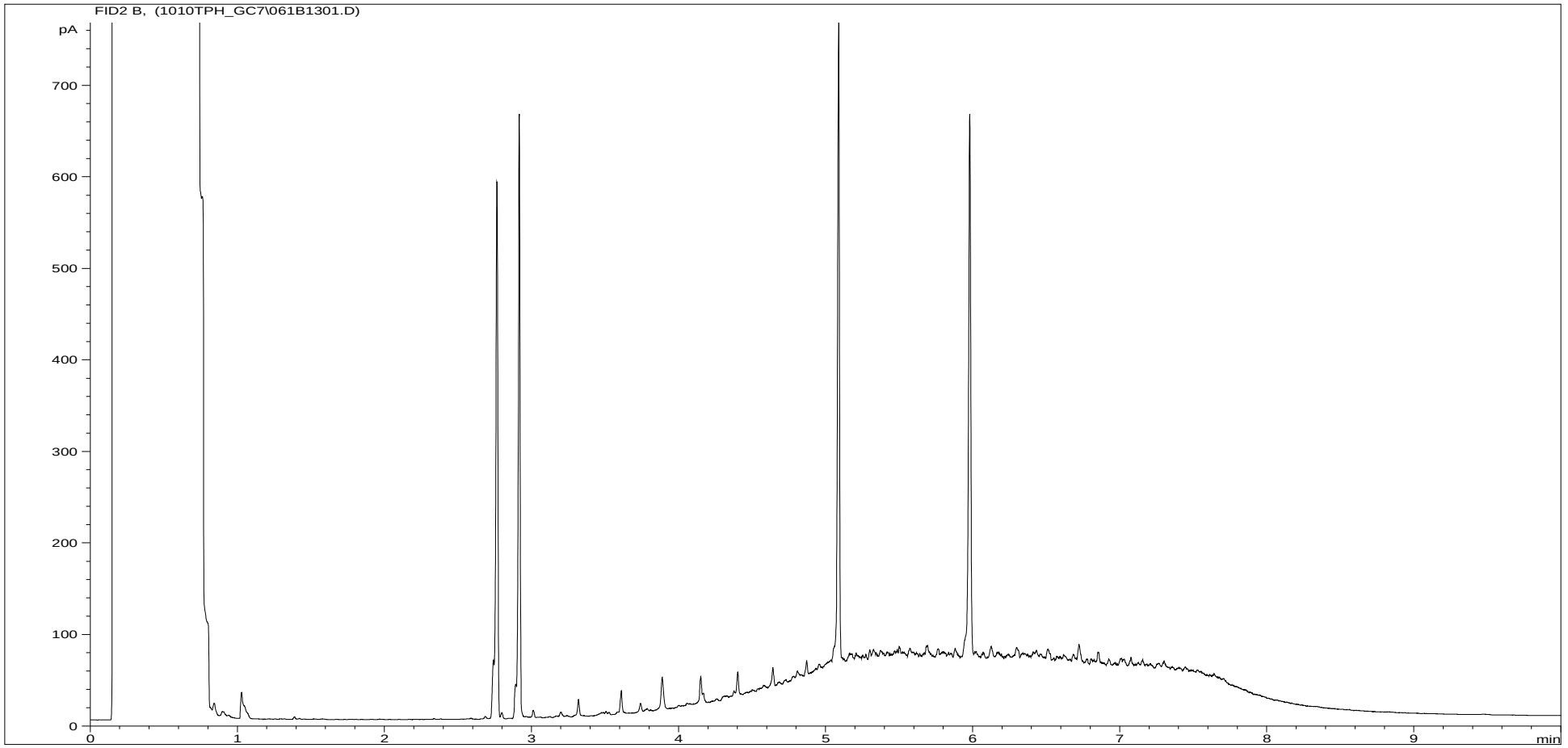


Sample ID:	CL0829482	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP1A ES 3 1.50
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\060B1201.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

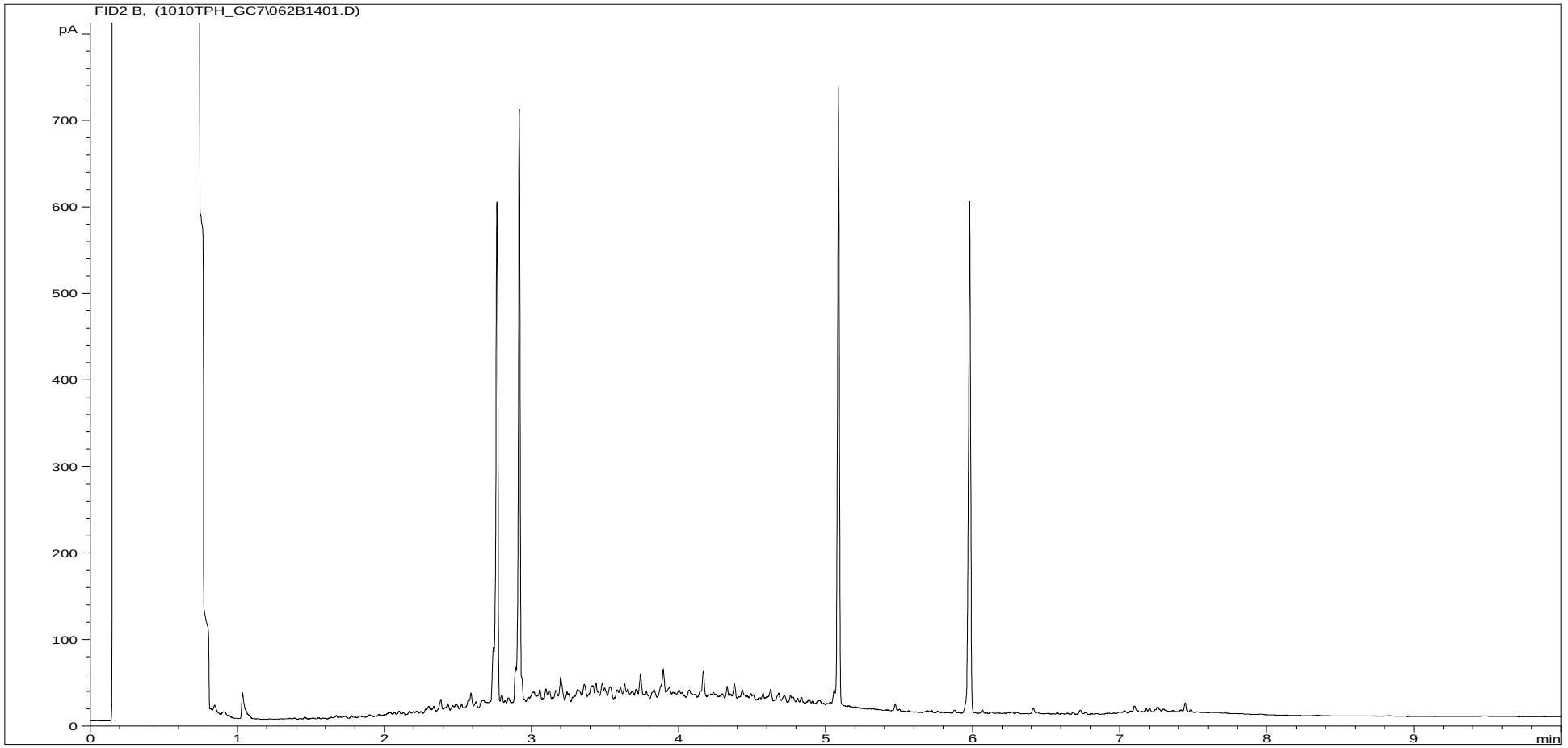


Sample ID:	CL0829483	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP2 ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\061B1301.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

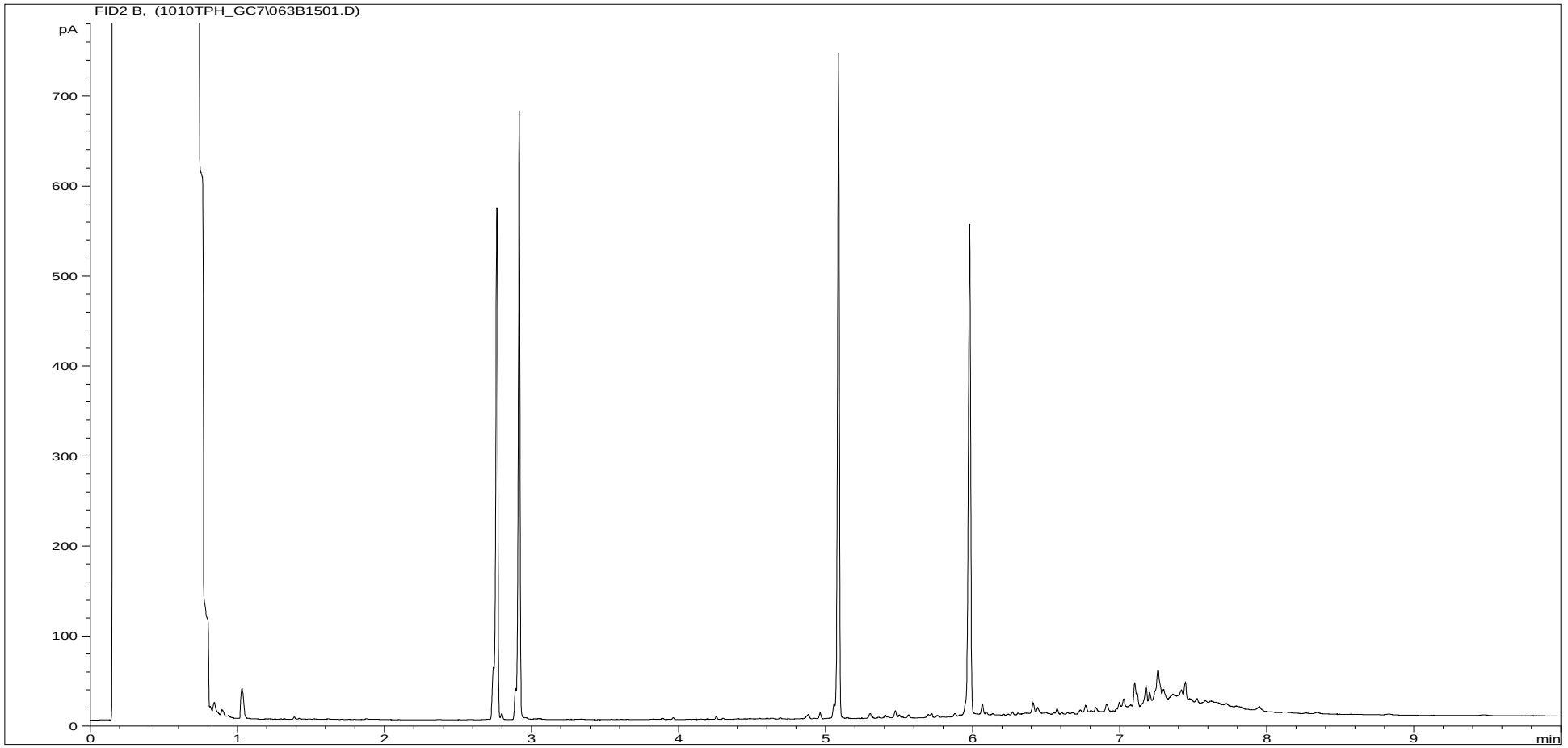


Sample ID:	CL0829484	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP2 ES 5 2.70
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\062B1401.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

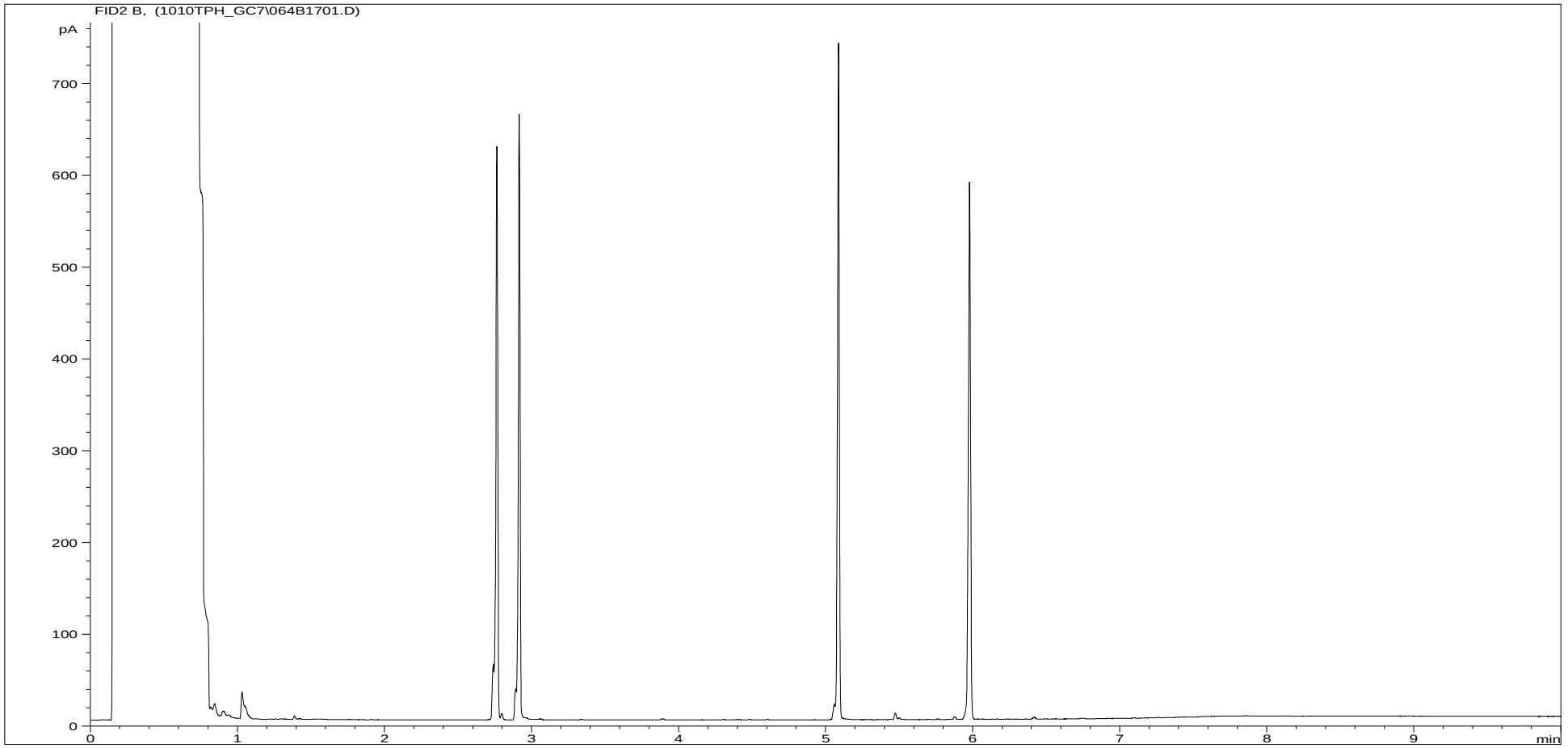


Sample ID:	CL0829485	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP2 ES 6 3.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\063B1501.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

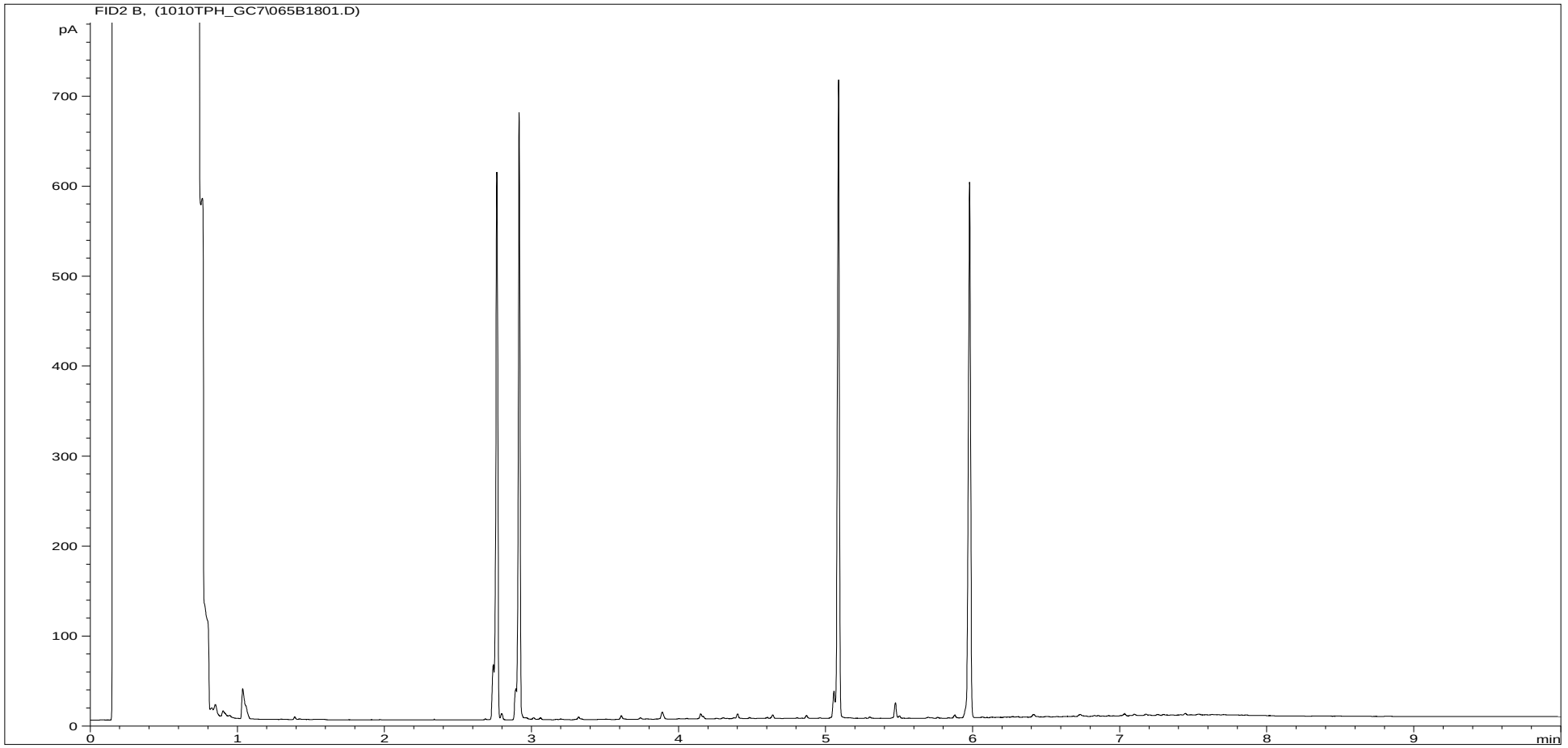


Sample ID:	CL0829486	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP3 ES 2 0.50
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\064B1701.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

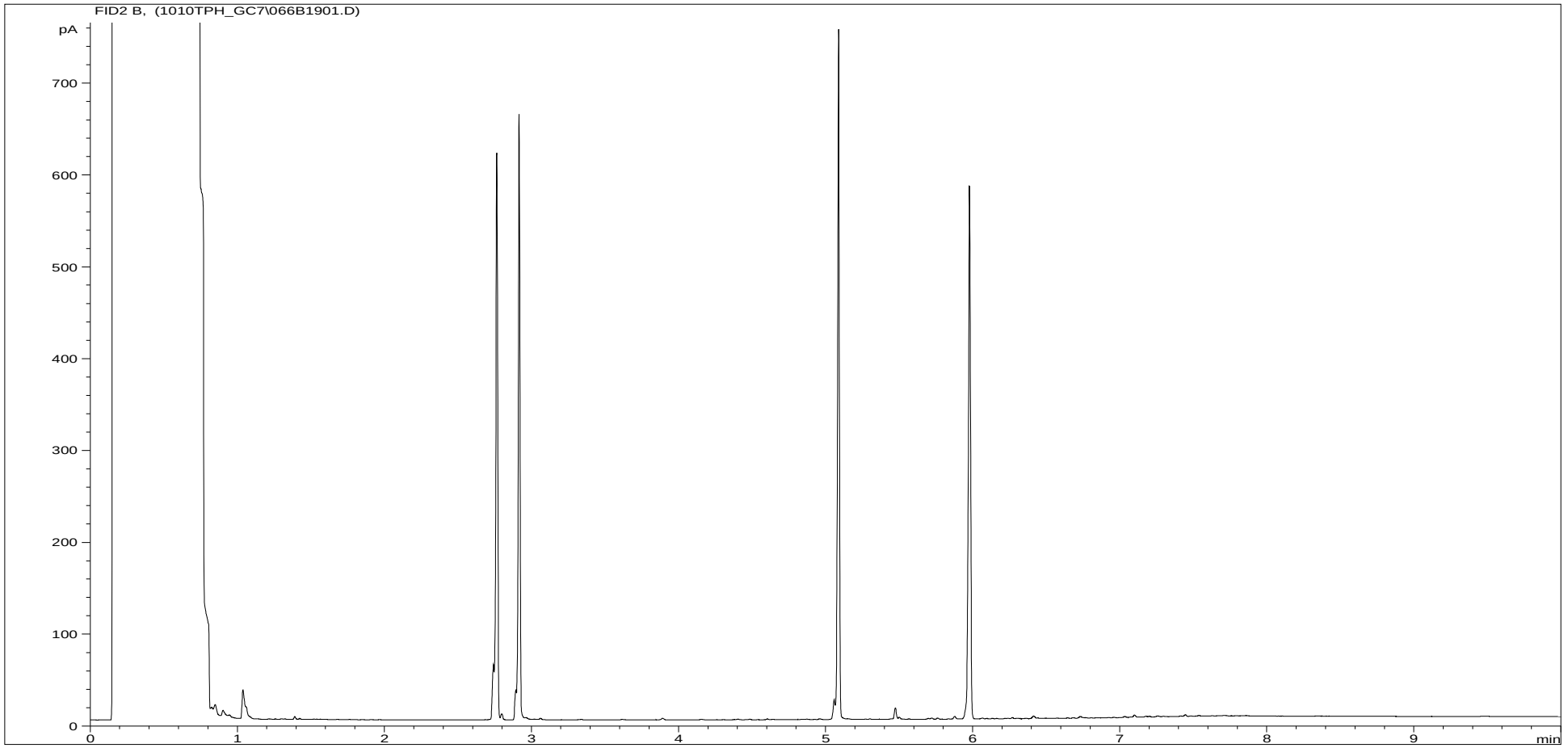


Sample ID:	CL0829487	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP4 ES 2 0.70
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\065B1801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

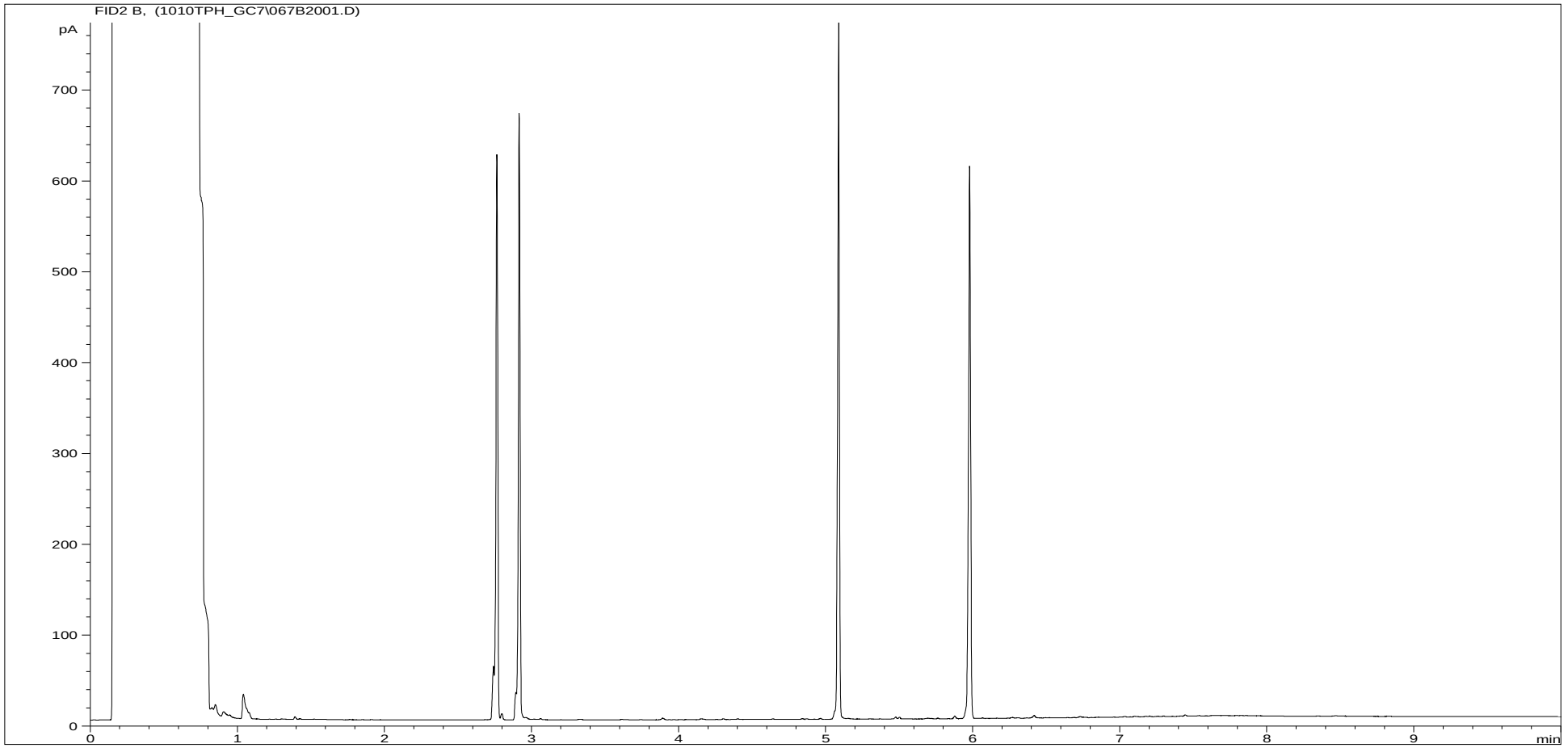


Sample ID:	CL0829488	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP5 ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\066B1901.D		

Where individual results are flagged see report notes for for status.

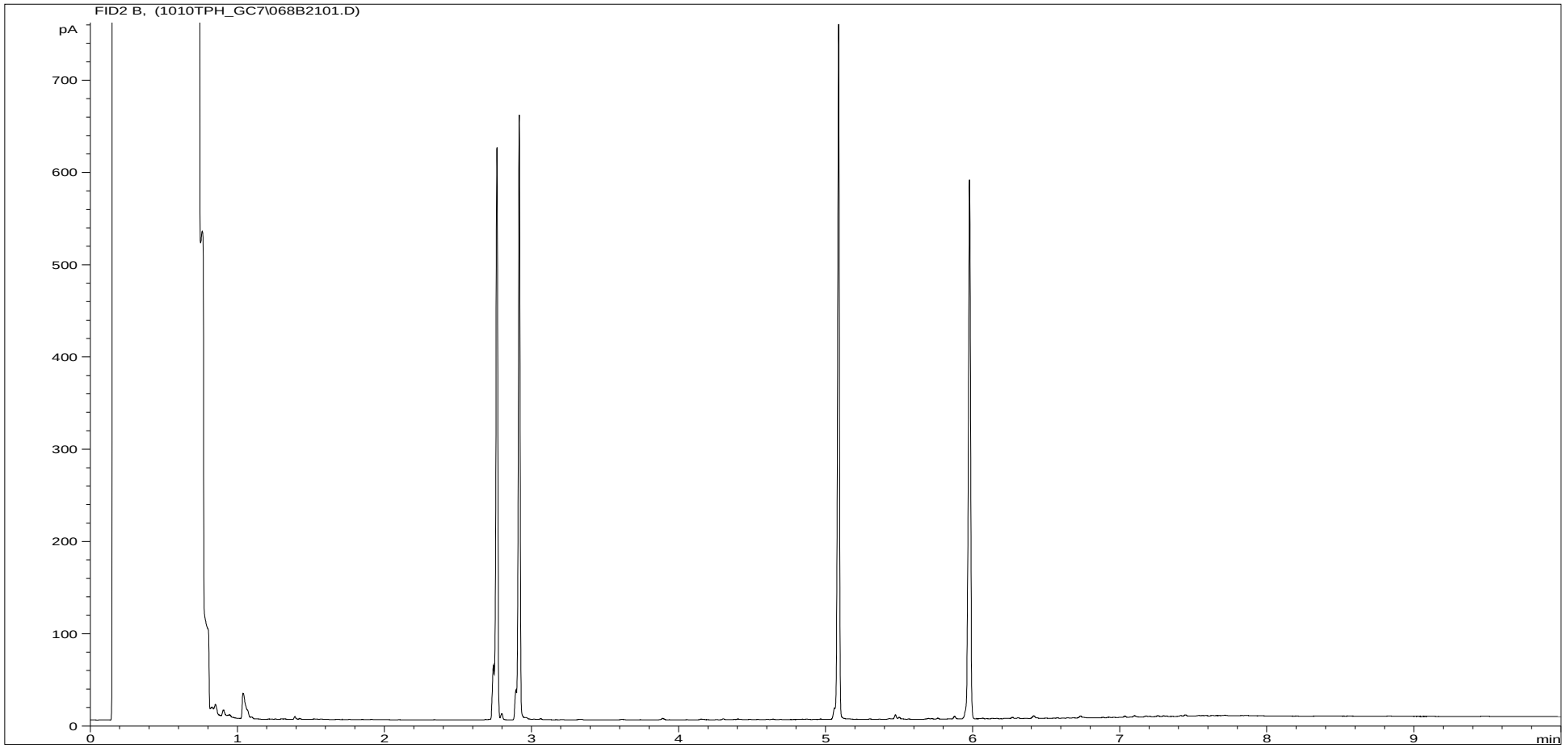
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829489	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP6 ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\067B2001.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID

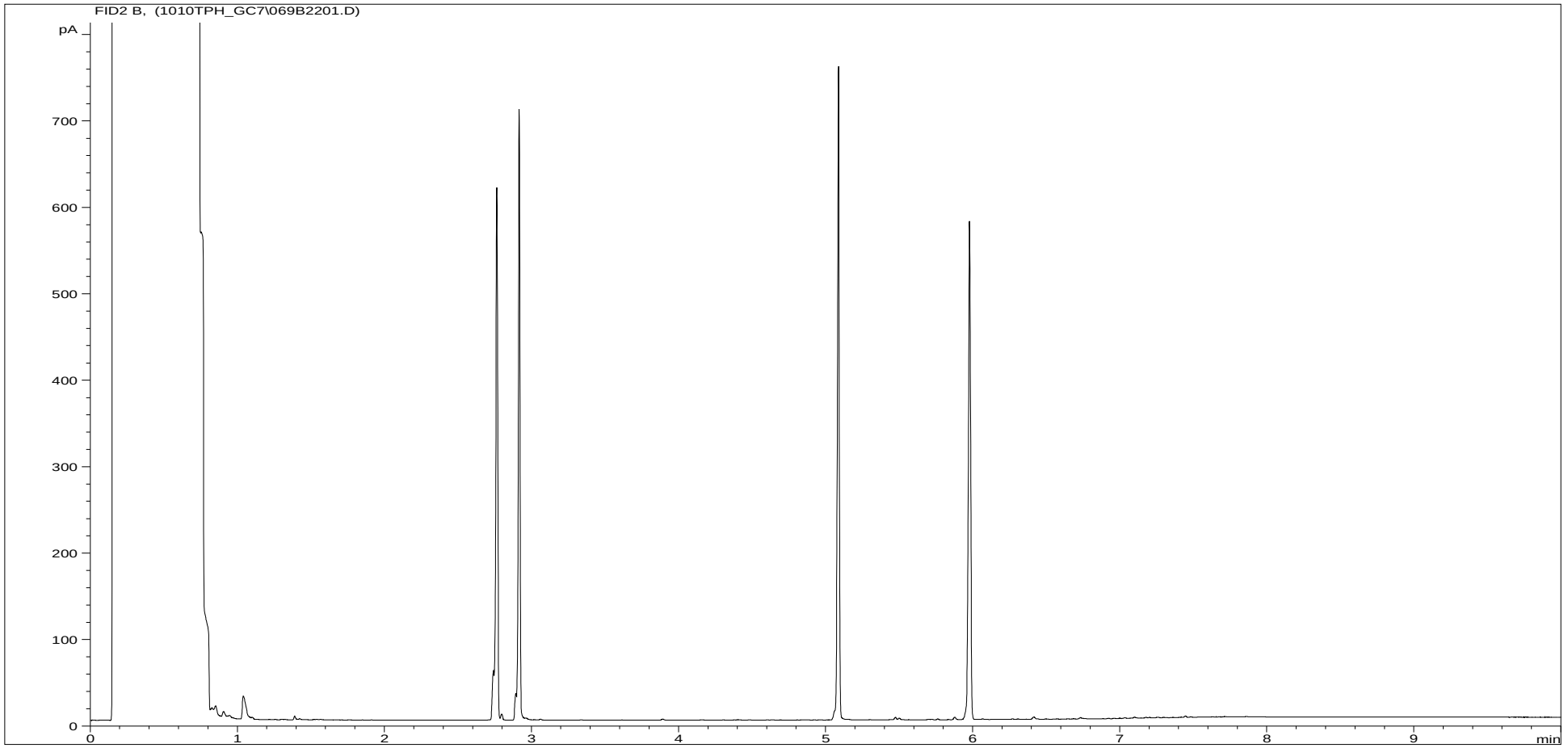


Sample ID:	CL0829490	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP7 ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\068B2101.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

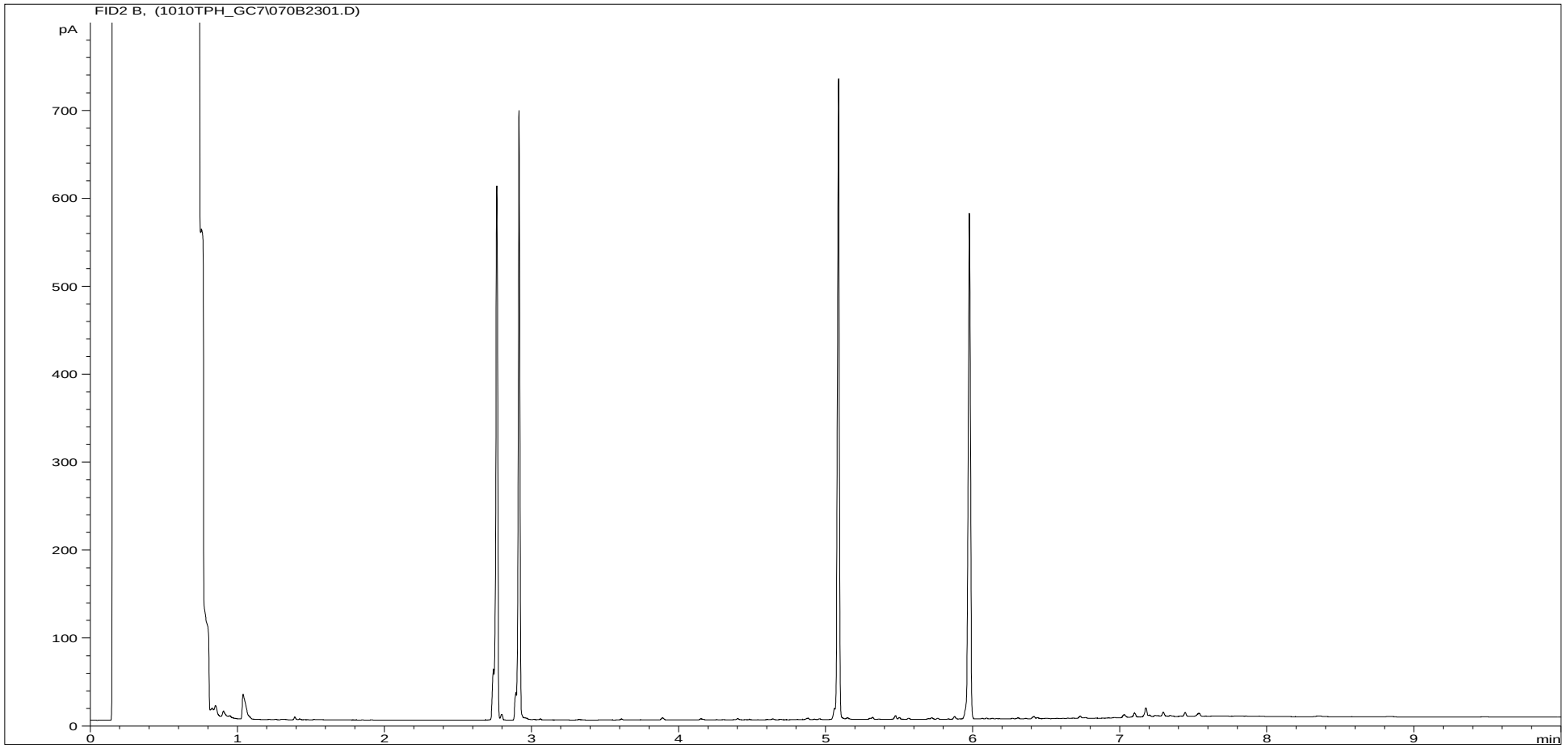


Sample ID:	CL0829491	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP8 ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\069B2201.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

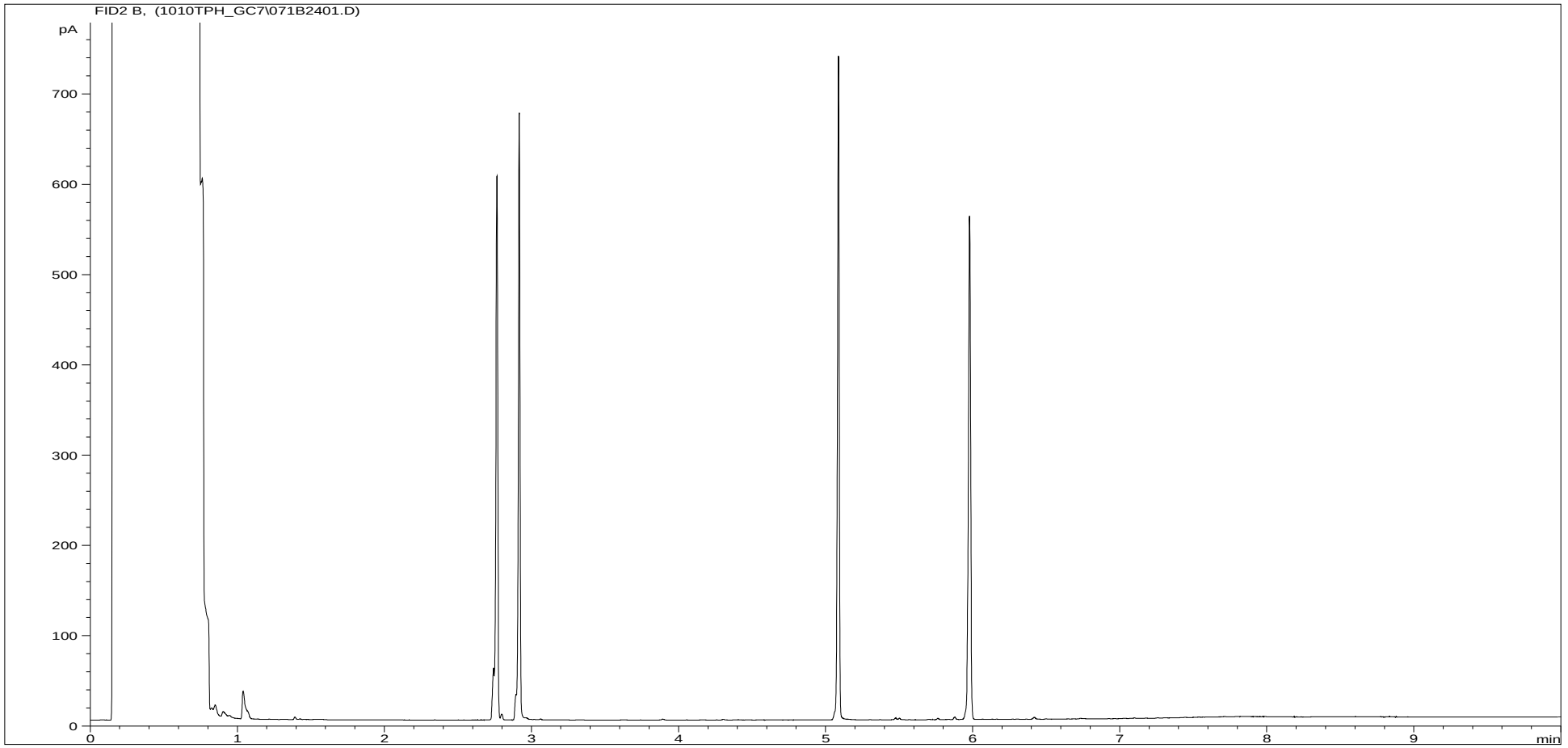


Sample ID:	CL0829492	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP8 ES 3 0.80
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\070B2301.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

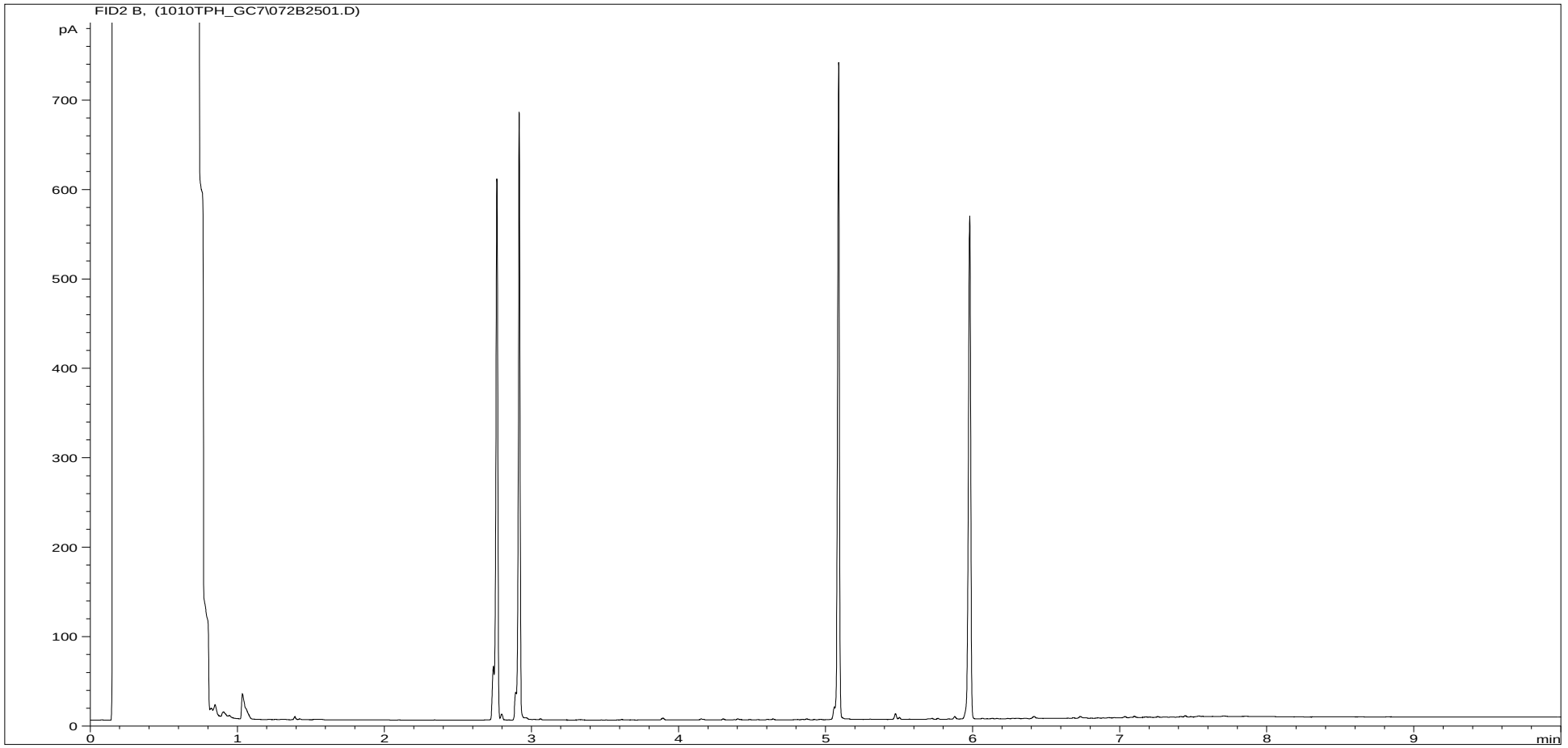


Sample ID:	CL0829493	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP9 ES 2 0.70
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\071B2401.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

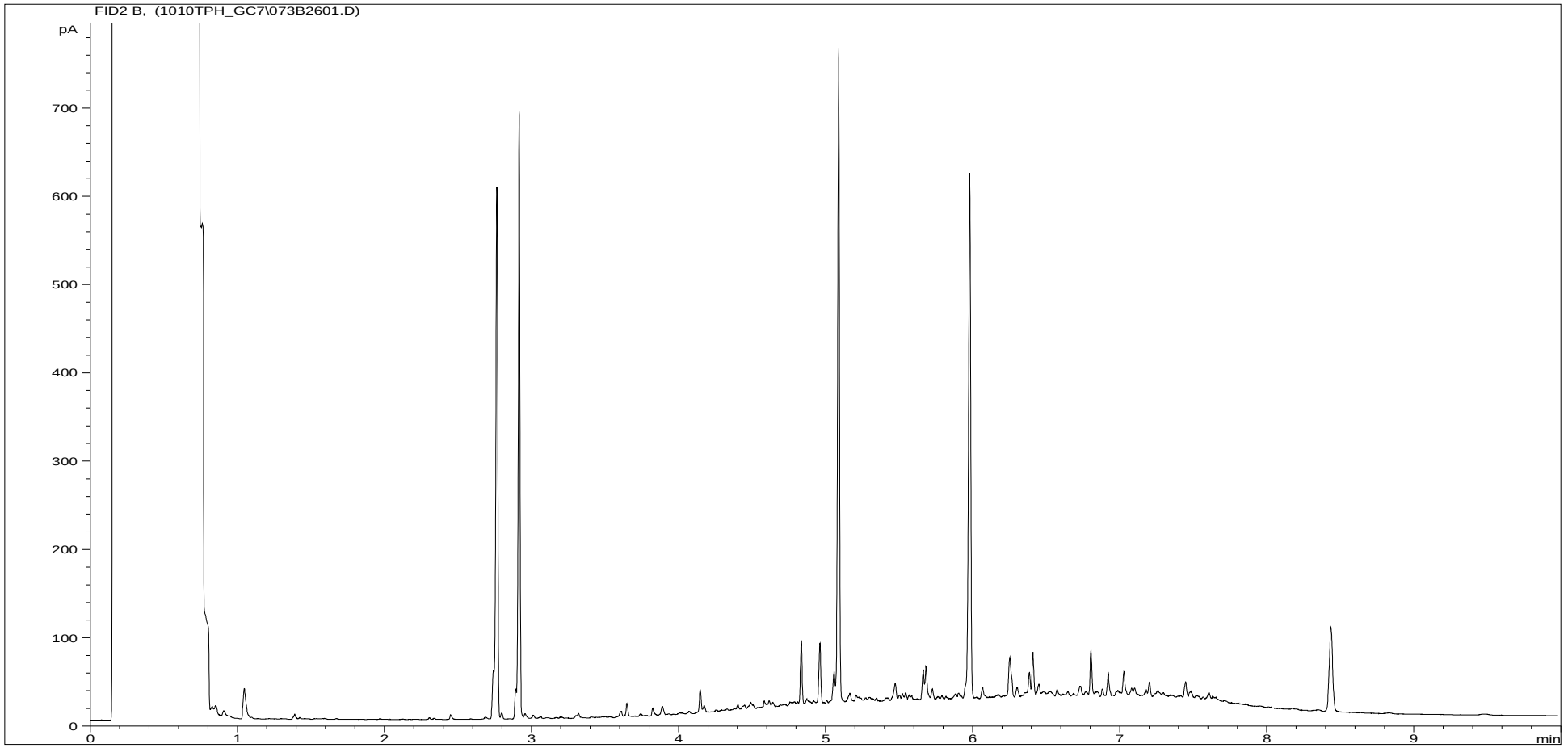


Sample ID:	CL0829494	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP10 ES 1 0.30
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\072B2501.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

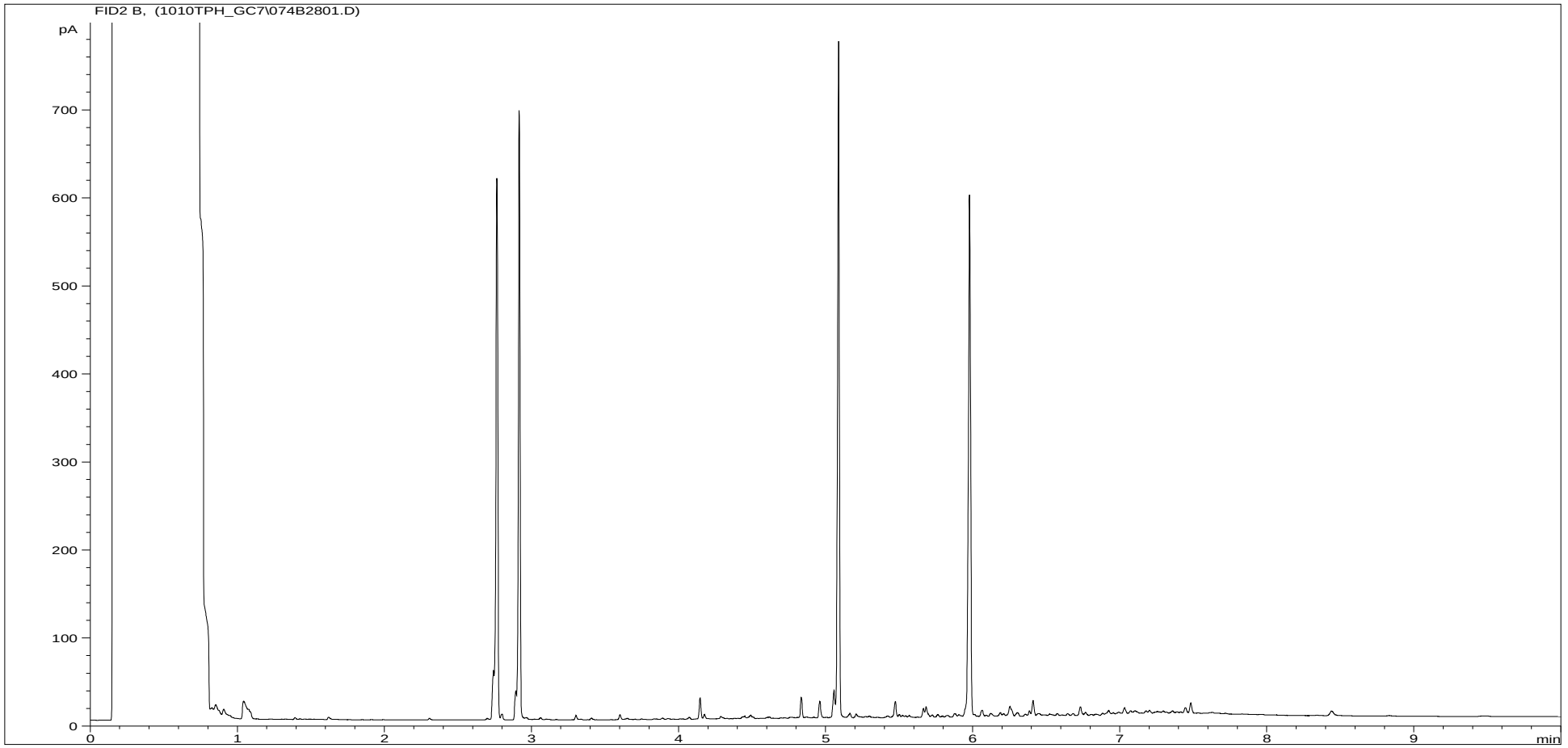


Sample ID:	CL0829495	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP10 ES 2 0.70
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\073B2601.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829496	**Job Number:**	S08_6407M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP11 ES 2 1.60
Acquisition Date/Time:	10-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1010TPH_GC7\074B2801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Report Notes

Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated
Water Soluble Sulphate on 2:1 water:soil extract
AR denotes analysis conducted on the As Received sample

Water analysis specific:
Results expressed as mg/l unless stated otherwise

Oil analysis specific:
Results expressed as mg/kg unless stated otherwise
S.G. expressed as g/cm^3@ 15^{o}C

Filter analysis specific:
Results expressed as mg on filter unless stated otherwise

VOC analysis specific:
Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:
Results expressed as ug/l unless stated otherwise

Air (Carbon tube) analysis specific:
Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibres Observed

General notes:
^ this analysis was subcontracted to another laboratory
$ Within laboratory tolerances
$$ unable to analyse due to nature of sample
¥ Results for guidance only, possible interference
& Blank corrected
I.S insufficient sample for analysis
Intf Unable to analyse due to interferences
N.D Not determined
N.R Not recorded
N.Det Not detected
Req Analysis Requested, see attached sheets for results
Þ Raised detection limit due to nature of sample
***** denotes that all accreditation has been removed by the laboratory for this result.
‡ denotes that Mcerts accreditation has been removed by the laboratory for this result.
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

END OF REPORT

TEST REPORT
SOIL SAMPLE ANALYSIS

1252

TES Report No. EFS/086384M (Ver. 1)

Soil Mechanics
Unit 15
Crosby Yard
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Hirwaun Industrial Estate

The 20 samples described in this report were logged for analysis by TES Bretby on 05-Oct-2008.
The analysis was completed by: 21-Oct-2008

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

On behalf of
TES Bretby :
J Hannah

J. Hannah
Project Co-ordinator

Date of Issue: 21-Oct-2008

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Sample Descriptions

Client : Soil Mechanics

Site : Hirwaun Industrial Estate

Report Number : S08_6384M

Lab ID Number	Client ID	Description
CL/0829247	TP3 ES 3 1.20	Brown SILT
CL/0829248	TP3 ES 4 1.90	Brown SILT
CL/0829249	TP5 ES 4 2.00	Brown SILT
CL/0829250	TP6 ES 5 2.60	Brown CLAY
CL/0829251	TP8 ES 4 1.50	Brown SILT
CL/0829252	BH101 ES 6 2.50	Brown Gravel SILT
CL/0829253	BH101 ES 10 4.50	Brown Stone SILT
CL/0829254	BH102 ES 7 2.50	Brown CLAY
CL/0829255	BH103 ES 3 0.70	Brown CLAY
CL/0829256	BH104 ES 9 3.50	Brown CLAY
CL/0829257	BH104 ES 13 5.50	Brown CLAY
CL/0829258	BH105 ES 6 2.50	Brown CLAY
CL/0829259	BH105 ES 8 3.50	Brown CLAY
CL/0829260	BH106 ES 10 1.50	Brown CLAY
CL/0829261	BH106 ES 7 2.50	Brown CLAY
CL/0829262	BH107 ES 2 0.70	Brown CLAY
CL/0829263	BH108 ES 2 0.70	Brown Gravel SILT
CL/0829264	BH109 ES 1 0.30	Brown CLAY
CL/0829265	BH109 ES 6 2.50	Brown Gravel SILT
CL/0829266	BH101 ES 0.70	Brown Gravel SILT

Units :		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg
Method Codes :		ELESULP	ICPACIDS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	TMSS	TPHFIDUS	TPHFIDUS
Method Reporting Limits :		20	20	0.5	2	0.1	3	3	3.5	0.10	0.5	2.5	0.5	19.5	0.2	10.0	10.0
Accreditation Code:		UM	UM	U	UM	U	UM	UM	UM	U	U	UM	U	UM	U	UM	
TES ID Number CL/	**Client Sample Description**	**Elemental Sulphur**	**SO4-- (acid sol)**	**Antimony (MS)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Molybdenum (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**
0829266	BH101 ES 0.70	<19	<19	<0.5	5.4	<0.1	44.3‡	8	9.3	<0.1	4.2	13.5	<0.5	30.2	12.5	61	Req
0829252	BH101 ES 6 2.50	28	2310	<0.5	2.3	<0.1	21‡	4.9	33.2	<0.1	<0.5	5.1	1.1	<20.3	10.5	11.2	Req
0829253	BH101 ES 10 4.50	<22	70	<0.5	2.3	<0.1	9.8‡	6.6	9.7	<0.1	<0.5	15.9	<0.5	29.8	16.3	<11.9	Req
0829254	BH102 ES 7 2.50	<21	<21	<0.5	4.4	<0.1	7.9‡	7.4	9	<0.1	<0.5	13	<0.5	27.8	14.5	<11.7	Req
0829255	BH103 ES 3 0.70	21	144	<0.5	7.3	0.2	13.1‡	14.8	16.3	<0.1	<0.5	18.7	<0.5	54.1	16.3	<11.9	Req
0829256	BH104 ES 9 3.50	<21	142	<0.5	10	<0.1	17.8‡	18.5	20	<0.1	<0.5	25.4	<0.5	38.8	26.0	<13.5	Req
0829257	BH104 ES 13 5.50	<21	<21	<0.5	3	<0.1	13.1‡	14	15.1	<0.1	<0.5	21.2	<0.5	38.2	14.9	<11.8	Req
0829258	BH105 ES 6 2.50	<21	118	<0.5	6.5	0.16	14.5‡	22.8	17.8	<0.1	<0.5	18.9	<0.5	103.1	19.9	<12.5	Req
0829259	BH105 ES 8 3.50	<21	<21	<0.5	7.9	<0.1	14.5‡	14.7	14.8	<0.1	<0.5	18.7	<0.5	36.5	17.1	94	Req
0829260	BH106 ES 10 1.50	<21	240	<0.5	6.7	0.25	12.5‡	12.2	14.3	<0.1	<0.5	11.5	0.6	93	18.6	12.3	Req
0829261	BH106 ES 7 2.50	<21	32	<0.5	9.4	<0.1	18.9‡	20.3	21	<0.1	<0.5	22	<0.5	49.5	19.1	<12.4	Req
0829262	BH107 ES 2 0.70	<20	34	<0.5	7.2	0.1	14.9‡	16	18.9	<0.1	<0.5	23.8	<0.5	46.6	12.7	<11.5	Req
0829263	BH108 ES 2 0.70	<19	<19	<0.5	5	<0.1	8.3‡	8.2	13	<0.1	<0.5	16	<0.5	36.8	14.2	<11.7	Req
0829264	BH109 ES 1 0.30	<21	95	0.7	9.6	0.23	11.5‡	16	21.6	<0.1	<0.5	19.8	<0.5	67.4	13.4	104	Req
0829265	BH109 ES 6 2.50	20	205	<0.5	6.3	0.12	9.4‡	8.2	12.5	<0.1	<0.5	13.4	<0.5	28.1	16.8	302	Req
0829247	TP3 ES 3 1.20	<20	103	<0.5	5.6	<0.1	8.8‡	10.5	12.6	<0.1	<0.5	13.4	<0.5	30.7	10.6	<11.2	Req
0829248	TP3 ES 4 1.90	<21	22	<0.5	5	<0.1	11.1‡	16	15.5	<0.1	<0.5	15.4	<0.5	37.7	8.9	<11.0	Req
0829249	TP5 ES 4 2.00	<20	68	<0.5	6.1	0.15	10‡	12.3	14.2	<0.1	<0.5	16	<0.5	43.8	9.6	<11.1	Req
0829250	TP6 ES 5 2.60	<22	29	0.6	8.6	0.21	11.2‡	12.4	15.3	0.94	<0.6	16.8	<0.6	51.5	13.0	<11.5	Req
0829251	TP8 ES 4 1.50	<20	57	<0.5	5.5	<0.1	8.8‡	10.6	11.3	<0.1	<0.5	13.9	<0.5	33.9	10.2	<11.1	Req

TES Bretby

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	21-Oct-08
Report Number	**EFS/086384M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :		pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% M/M			
Method Codes :		WSLM3	ICPBOR	ICPMAJ	KONECL	KONECR	PAHSCUV	SEN9	SFAPI	SFAPI	SFAPI	SFAPI	SFAS	WSLM59			
Method Reporting Limits :			0.5	1	5.0	0.1	10		0.5	0.5	0.5	2	0.5	0.02			
Accreditation Code:		U	N	N	N	N	N	N	N	N	N	N	N	N			
TES ID Number CL/	**Client Sample Description**	**pH units**	**Boron (H20 Soluble)**	**Barium**	**Chloride:**	**Chromium vi:**	**PAH (screening)**	**Asbestos (screening)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Thiocyanate(SCN)(AR)**	**Sulphide as S (AR)**	**F.O.C. %**			
0829266	BH101 ES 0.70	8.5	<0.5	61	17	<0.1	<10	NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.44			
0829252	BH101 ES 6 2.50	11.5	<0.5	611	53	<0.1	<10		<0.6	<0.6	<0.6	<2.2	<0.6	2.13			
0829253	BH101 ES 10 4.50	8.6	<0.5	45	20	<0.1	<11		<0.6	<0.6	<0.6	<2.4	<0.6	0.55			
0829254	BH102 ES 7 2.50	7.8	<0.5	63	11.4	<0.1	<10		<0.6	<0.6	<0.6	<2.3	<0.6	0.3			
0829255	BH103 ES 3 0.70	8.3	<0.5	110	24	<0.1	<10		<0.6	<0.6	<0.6	<2.4	<0.6	1.14			
0829256	BH104 ES 9 3.50	5.7	<0.5	82	21	<0.1	<11		<0.7	<0.7	<0.7	<2.7	<0.7	0.43			
0829257	BH104 ES 13 5.50	7.9	<0.5	75	21	<0.1	<10		<0.6	<0.6	<0.6	<2.4	<0.6	0.61			
0829258	BH105 ES 6 2.50	7.3	<0.5	155	26	<0.1	<10		<0.6	<0.6	<0.6	<2.5	<0.6	0.85			
0829259	BH105 ES 8 3.50	5.8	<0.5	88	35	<0.1	<10		<0.6	<0.6	<0.6	<2.4	<0.6	0.72			
0829260	BH106 ES 10 1.50	7.8	<0.5	255	37	<0.1	14		<0.6	<0.6	<0.6	<2.5	<0.6	1.1			
0829261	BH106 ES 7 2.50	6.8	<0.5	123	23	<0.1	<10		<0.6	<0.6	<0.6	<2.5	<0.6	0.53			
0829262	BH107 ES 2 0.70	8.0	<0.5	190	23	<0.1	<10		<0.6	<0.6	<0.6	<2.3	<0.6	0.5			
0829263	BH108 ES 2 0.70	7.7	<0.5	134	16	<0.1	32		<0.6	<0.6	<0.6	<2.3	<0.6	0.27			
0829264	BH109 ES 1 0.30	7.9	<0.5	121	20	<0.1	22		<0.6	<0.6	<0.6	<2.3	<0.6	1.51			
0829265	BH109 ES 6 2.50	8.7	0.6	75	43	<0.1	17		<0.6	<0.6	<0.6	<2.4	<0.6	1.26			
0829247	TP3 ES 3 1.20	6.7	<0.5	22	18	<0.1	<10		<0.6	<0.6	<0.6	<2.2	<0.6	0.52			
0829248	TP3 ES 4 1.90	6.8	<0.5	3	21	<0.1	<10		<0.5	<0.5	<0.5	<2.2	<0.5	0.28			
0829249	TP5 ES 4 2.00	7.5	<0.5	71	19	<0.1	<10		<0.6	<0.6	<0.6	<2.2	<0.6	0.58			
0829250	TP6 ES 5 2.60	7.5	<0.6	91	28	<0.1	<11		<0.6	<0.6	<0.6	<2.3	<0.6	1.2			
0829251	TP8 ES 4 1.50	6.5	<0.5	19	22	<0.1	<10		<0.6	<0.6	<0.6	<2.2	<0.6	0.38			

TES Bretby

PO Box 100, Bretby Business Park,

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	21-Oct-08
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Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

	Units :	ug/kg	ug/kg	ug/kg	ug/kg												
	Method Codes :	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA												
	Method Reporting Limits :	10	10	10	20												
	Accreditation Code:	N	N	N	N												
TES ID Number CL/	**Client Sample Description**	**Benzene**	**Toluene**	**Ethyl Benzene**	**Xylenes**												
0829266	BH101 ES 0.70	<11	<11	<11	<23												
0829252	BH101 ES 6 2.50	<11	<11	<11	<22												
0829253	BH101 ES 10 4.50	<12	<12	<12	<24												
0829254	BH102 ES 7 2.50	<12	<12	<12	<23												
0829255	BH103 ES 3 0.70	<12	<12	<12	<24												
0829256	BH104 ES 9 3.50	<14	<14	<14	<27												
0829257	BH104 ES 13 5.50	<29	<29	<29	<59												
0829258	BH105 ES 6 2.50	<31	<31	<31	<62												
0829259	BH105 ES 8 3.50	<12	<12	<12	<24												
0829260	BH106 ES 10 1.50	<12	<12	<12	<25												
0829261	BH106 ES 7 2.50	<12	<12	<12	<25												
0829262	BH107 ES 2 0.70	<11	<11	<11	<23												
0829263	BH108 ES 2 0.70	<12	<12	<12	<23												
0829264	BH109 ES 1 0.30	<12	<12	<12	<23												
0829265	BH109 ES 6 2.50	<12	<12	<12	<24												
0829247	TP3 ES 3 1.20	<11	<11	<11	<22												
0829248	TP3 ES 4 1.90	<11	<11	<11	<22												
0829249	TP5 ES 4 2.00	<11	<11	<11	<22												
0829250	TP6 ES 5 2.60	<11	<11	<11	<23												
0829251	TP8 ES 4 1.50	<11	<11	<11	<22												

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Total Petroleum Hydrocarbons (TPH) Carbon Ranges

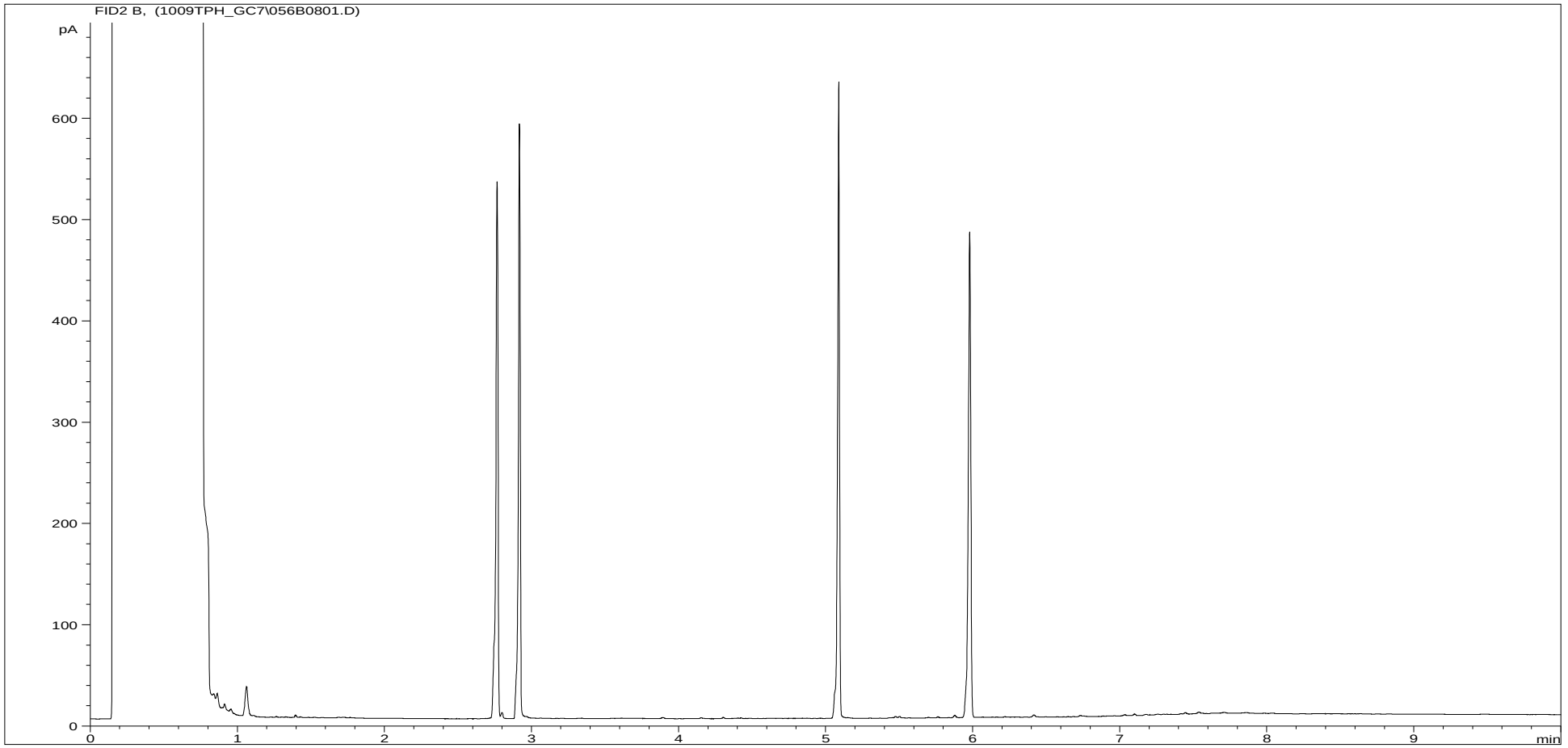
Customer and Site Details: Soil Mechanics : Hirwaun Industrial Estate
Job Number: S08_6384M
QC Batch Number: 83541
Directory: D:\TES\DATA\Y2008\1009TPH_GC7\075B2901.D
Method: Ultra Sonic
Accreditation code: U

Matrix: Soil
Date Booked in: 05-Oct-08
Date Extracted: 08-Oct-08
Date Analysed: 09-Oct-08

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL0829247	TP3 ES 3 1.20	<2	<2	<2	<2	4.93
CL0829248	TP3 ES 4 1.90	<2	<2	<2	<2	<4.81
CL0829249	TP5 ES 4 2.00	<2	<2	<2	<2	<4.85
CL0829250	TP6 ES 5 2.60	<2	<2	<2	<2	<5.03
CL0829251	TP8 ES 4 1.50	<2	<2	<2	<2	<4.88
CL0829252	BH101 ES 6 2.50	<2	<2	<2	2.87	<4.89
CL0829253	BH101 ES 10 4.50	<2	<2	<2	<2	<5.23
CL0829254	BH102 ES 7 2.50	<2	<2	<2	<2	<5.12
CL0829255	BH103 ES 3 0.70	<2	<2	<2	<2	<5.23
CL0829256	BH104 ES 9 3.50	<3	<3	<3	<3	<5.92
CL0829257	BH104 ES 13 5.50	<2	<2	<2	<2	<5.15
CL0829258	BH105 ES 6 2.50	<2	<2	<2	<2	<5.47
CL0829259	BH105 ES 8 3.50	<2	<2	<2	<2	84.9
CL0829260	BH106 ES 10 1.50	<2	<2	<2	<2	8.02
CL0829261	BH106 ES 7 2.50	<2	<2	<2	<2	<5.41
CL0829262	BH107 ES 2 0.70	<2	<2	<2	<2	<5.02
CL0829263	BH108 ES 2 0.70	<2	<2	<2	<2	<5.10
CL0829264	BH109 ES 1 0.30	<2	<2	4.47	10.5	68
CL0829265	BH109 ES 6 2.50	<2	<2	4.53	59.9	226
CL0829266	BH101 ES 0.70	<2	<2	12.5	17.6	23.2

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appropriat e, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

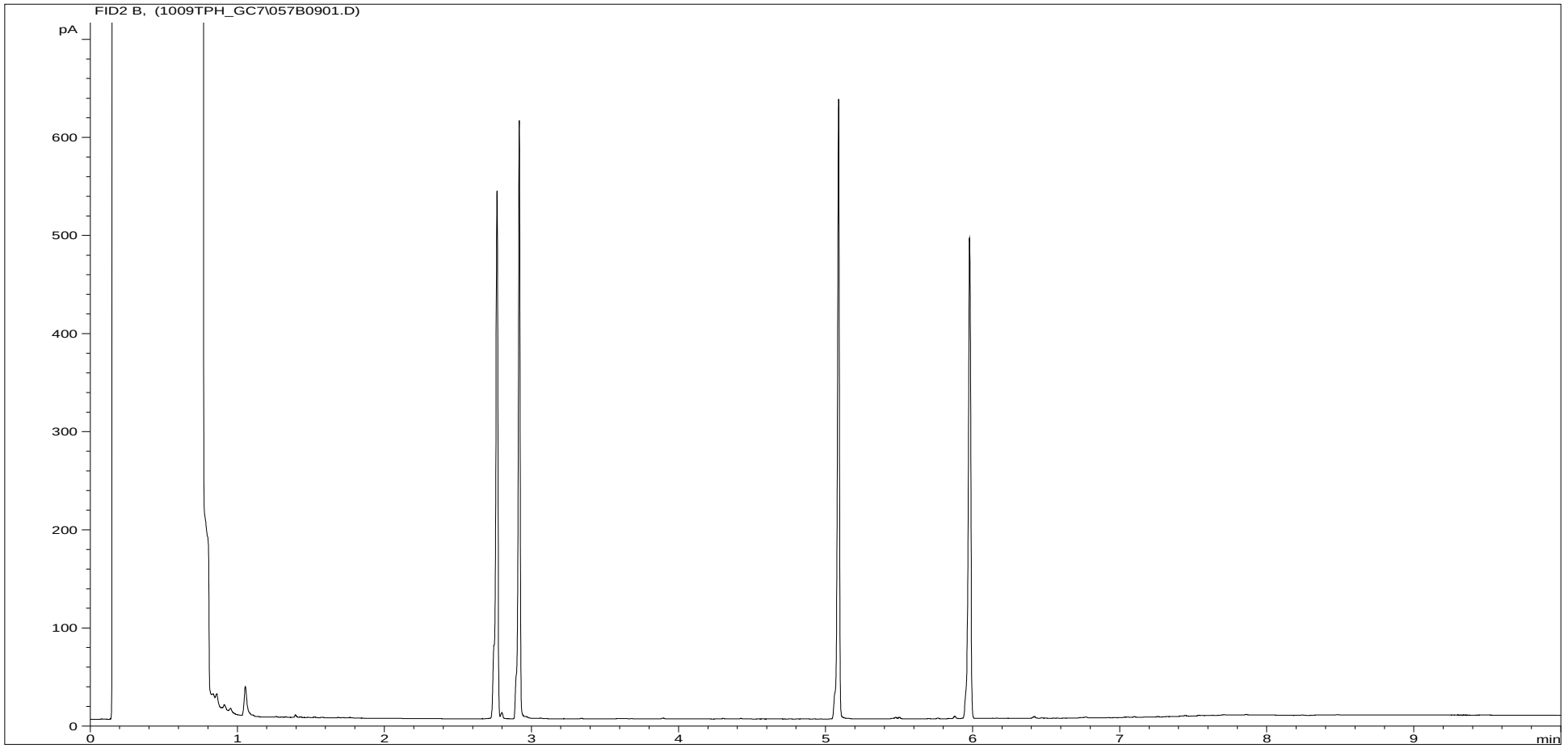


Sample ID:	CL0829247	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP3 ES 3 1.20
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\056B0801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

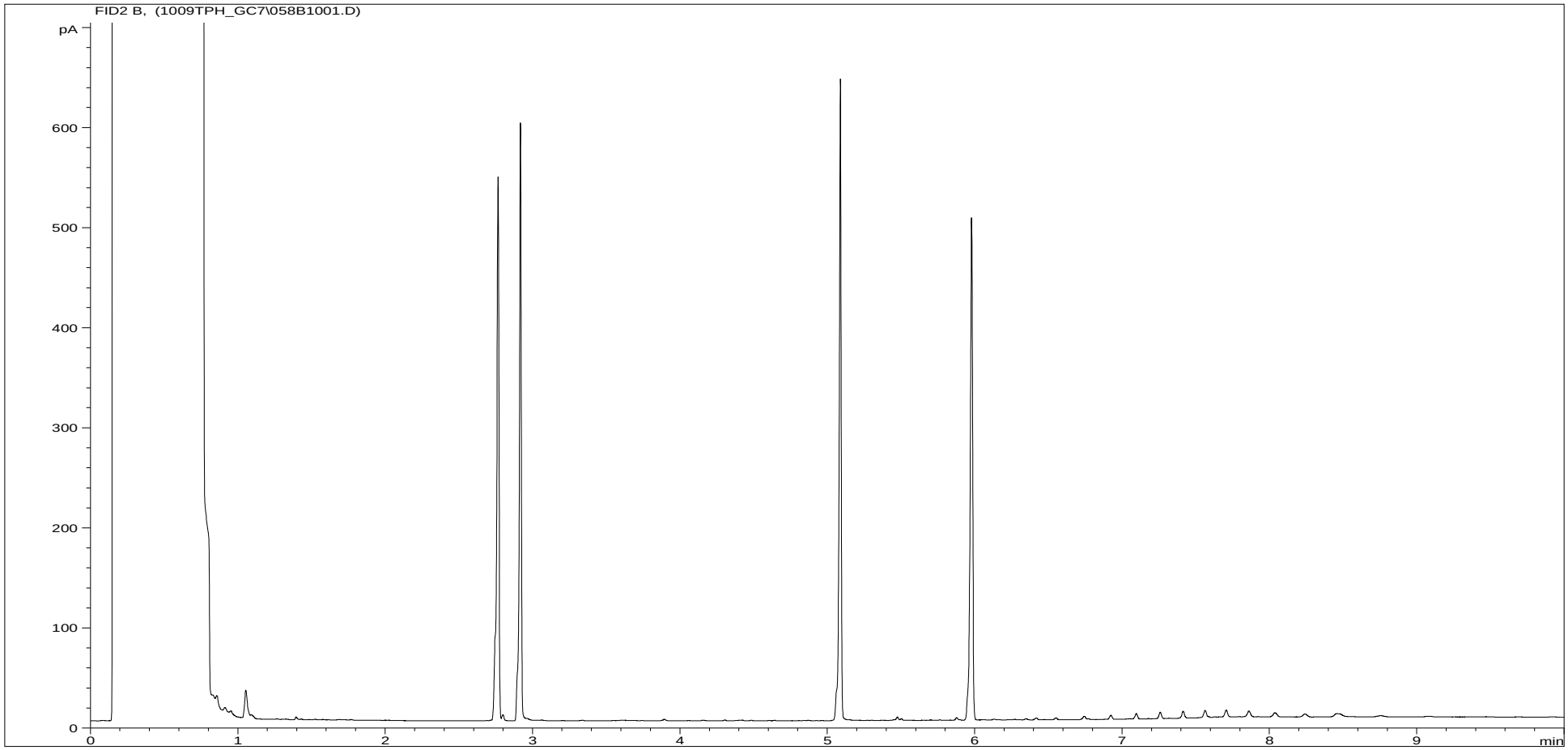


Sample ID:	CL0829248	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP3 ES 4 1.90
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\057B0901.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829249	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP5 ES 4 2.00
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\058B1001.D		

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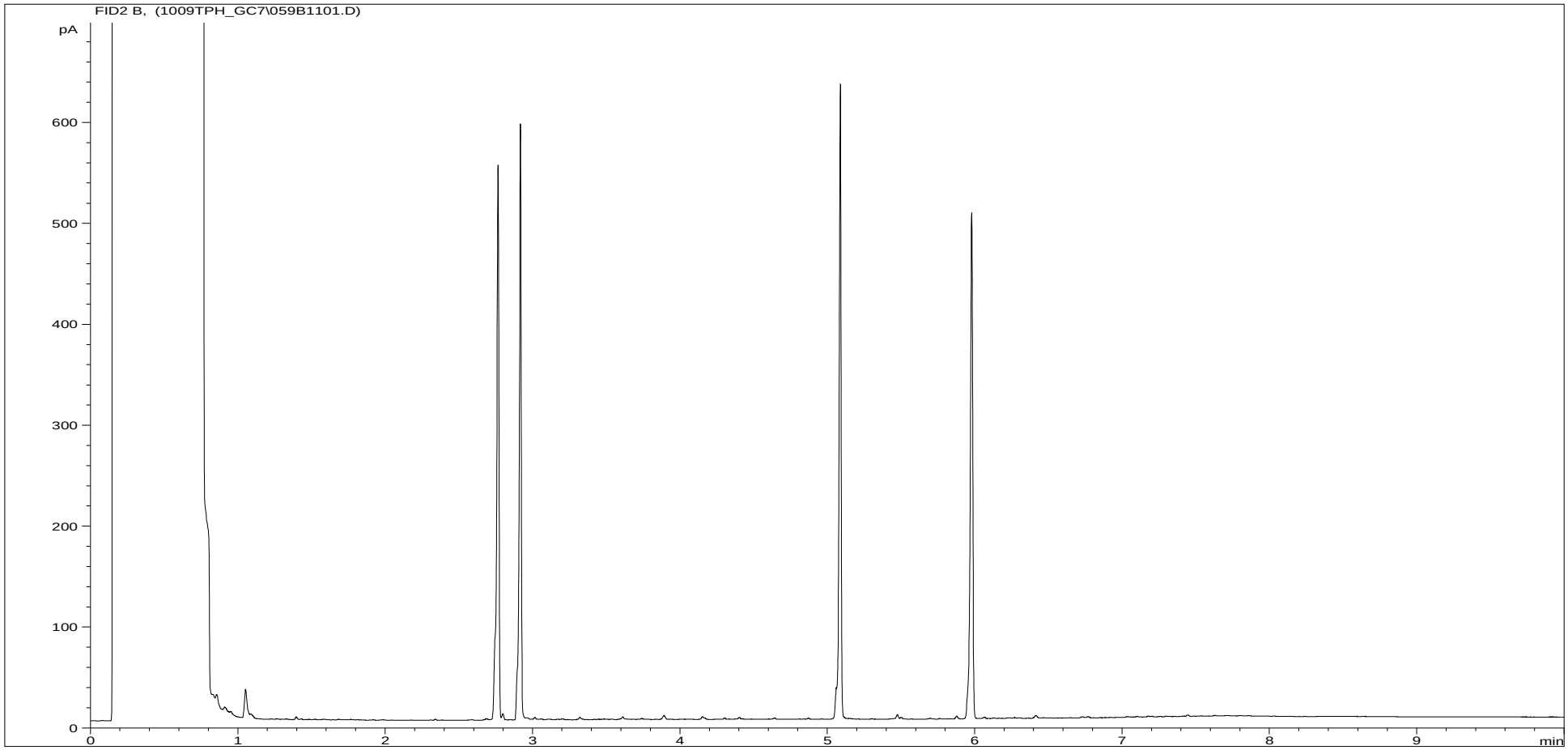
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829250	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP6 ES 5 2.60
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\059B1101.D		

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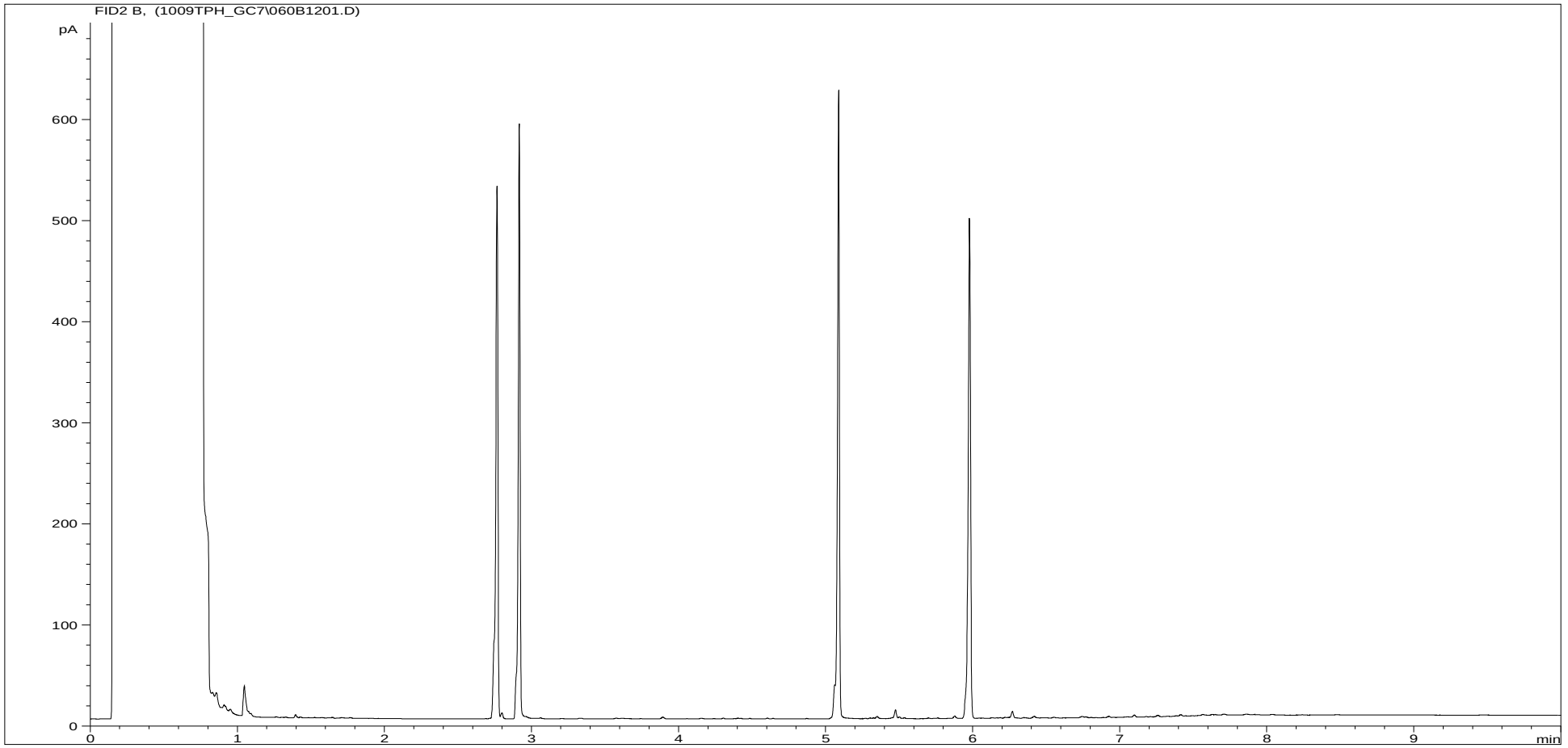
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

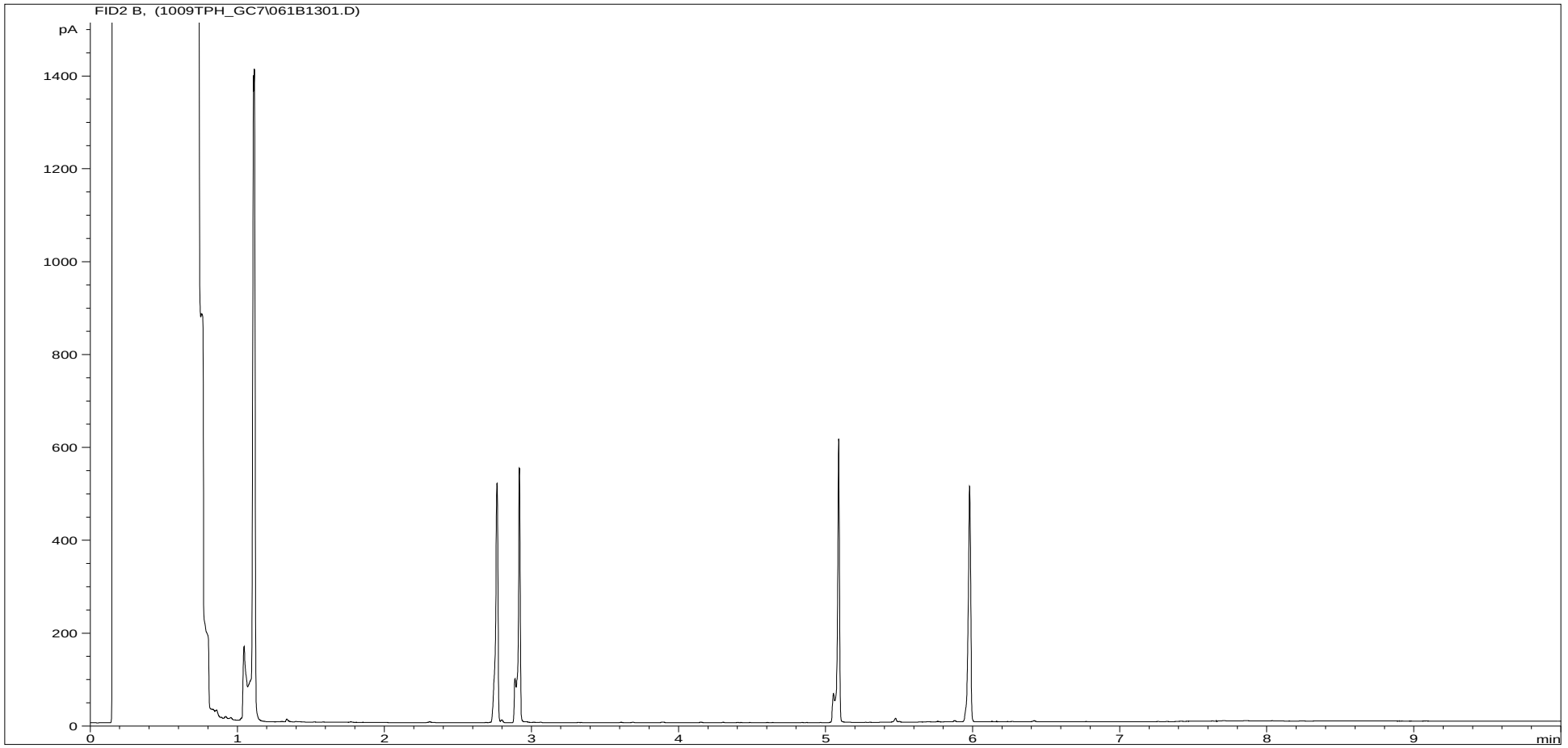


Sample ID:	CL0829251	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP8 ES 4 1.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\060B1201.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829252	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH101 ES 6 2.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\061B1301.D		

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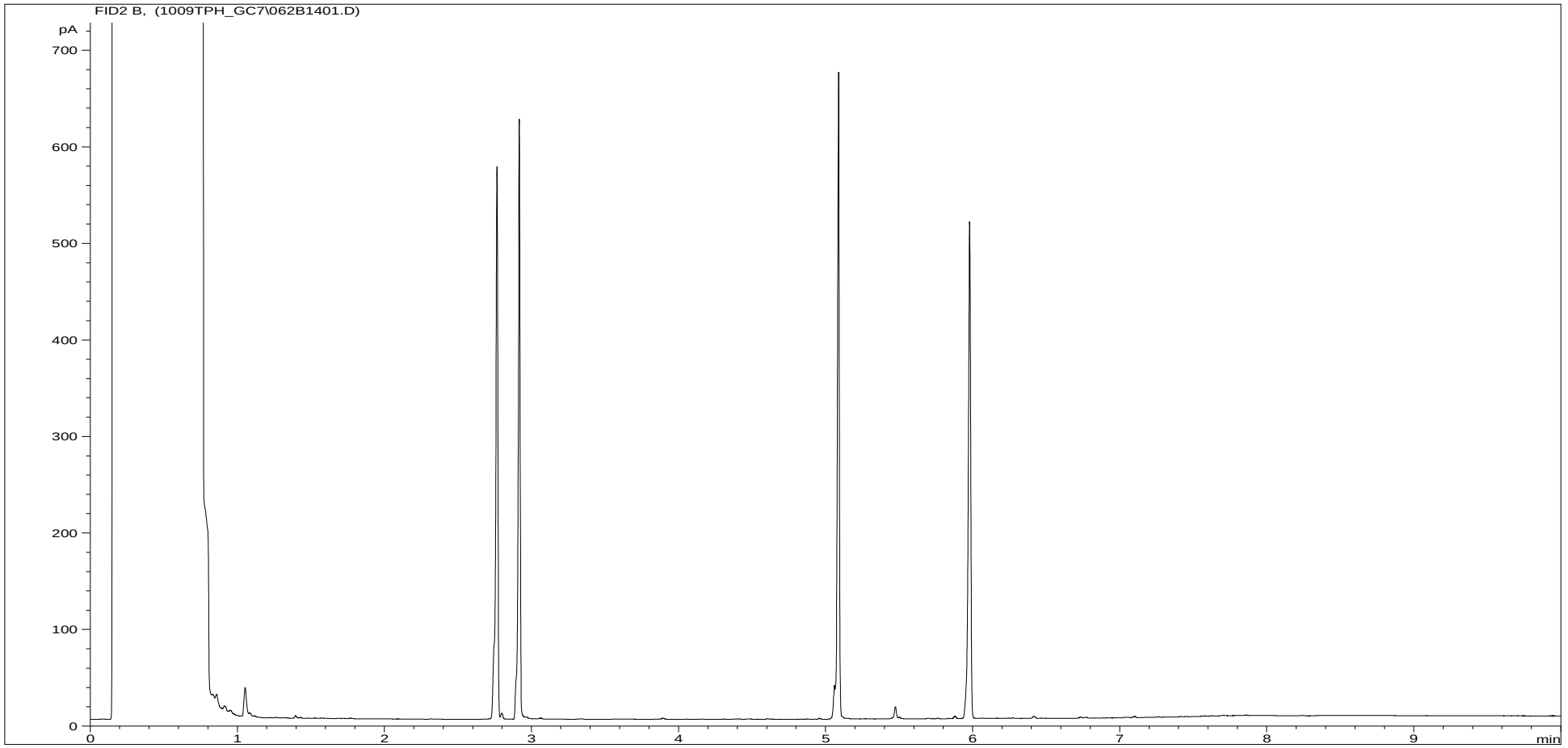
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829253	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH101 ES 10 4.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\062B1401.D		

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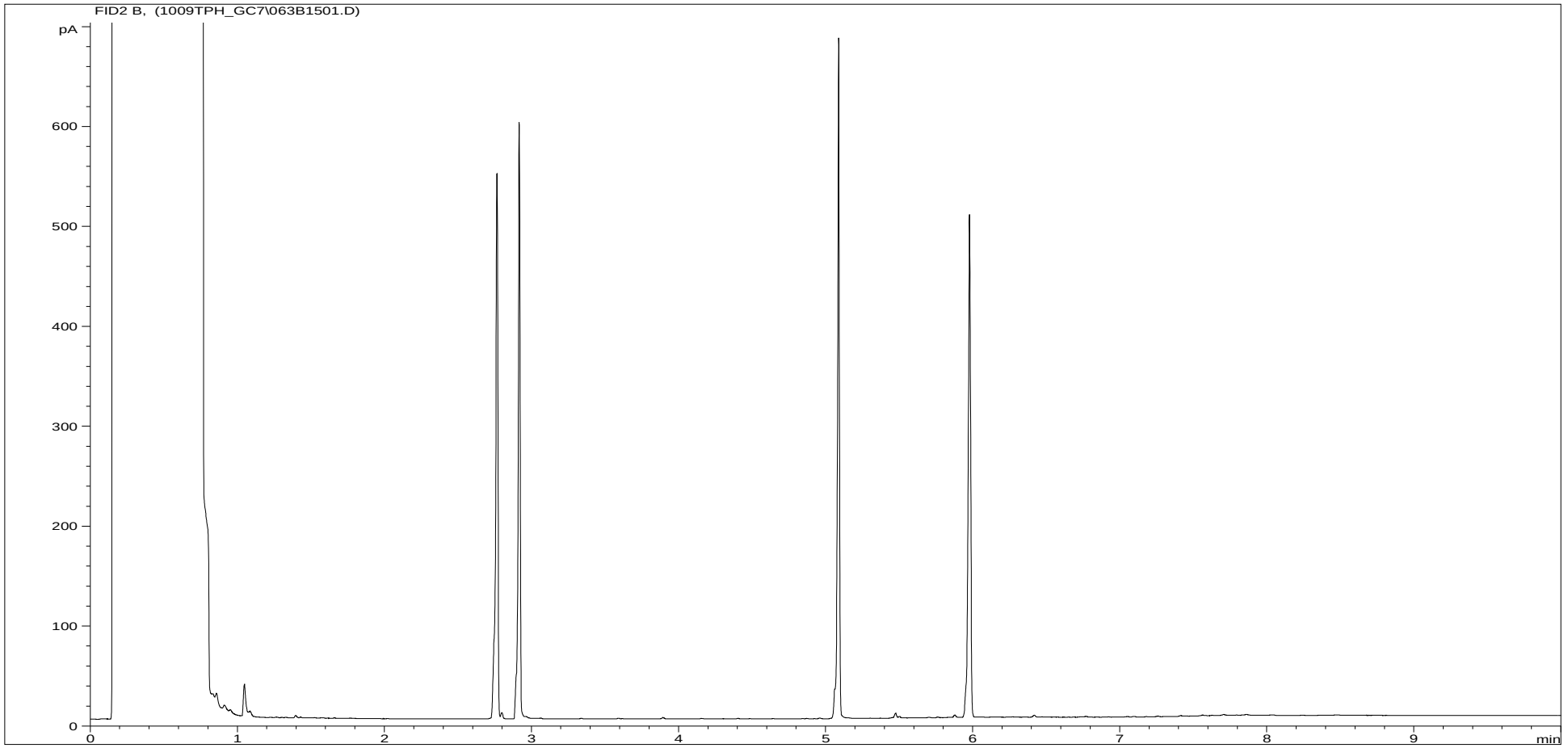
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829254	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH102 ES 7 2.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\063B1501.D		

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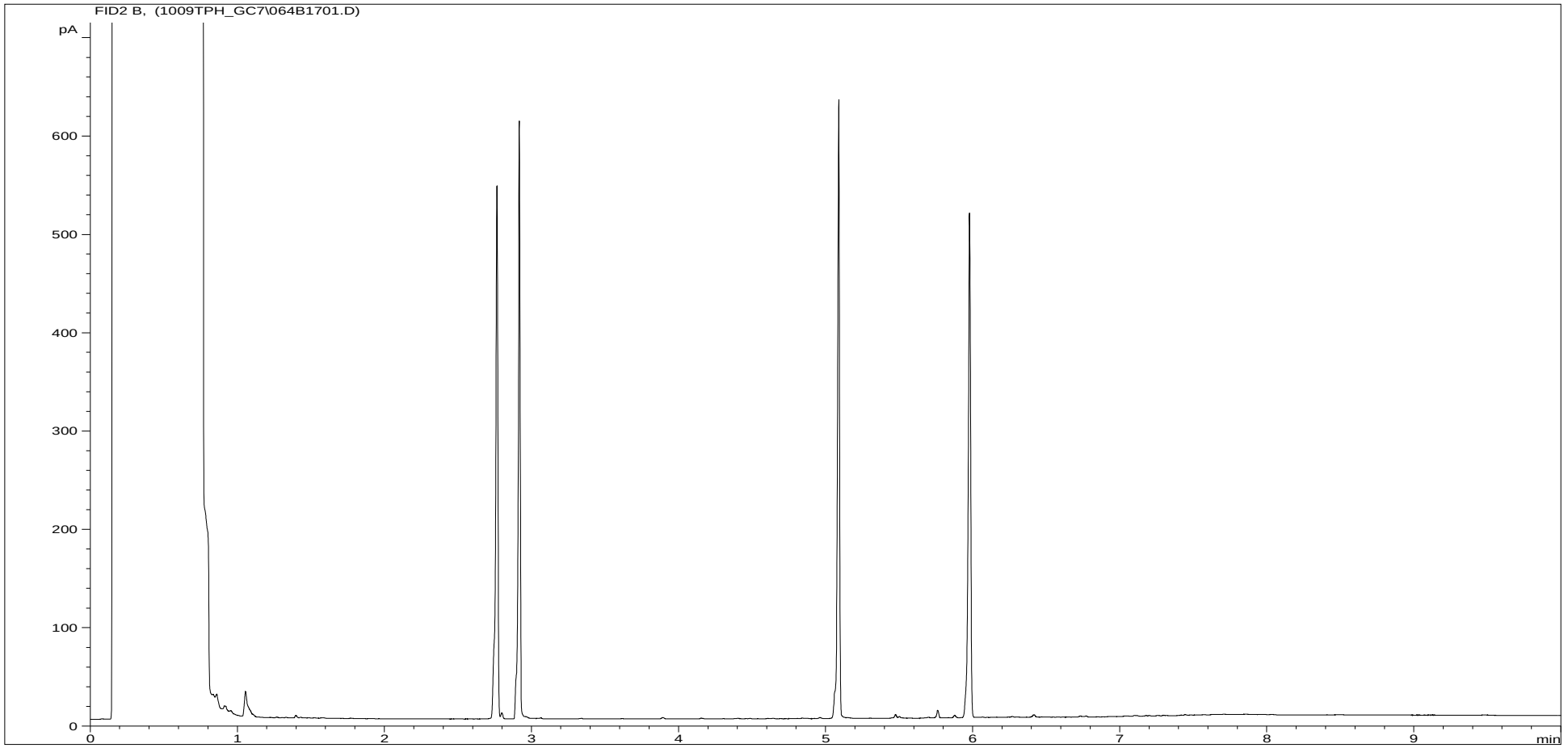
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829255	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH103 ES 3 0.70
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\064B1701.D		

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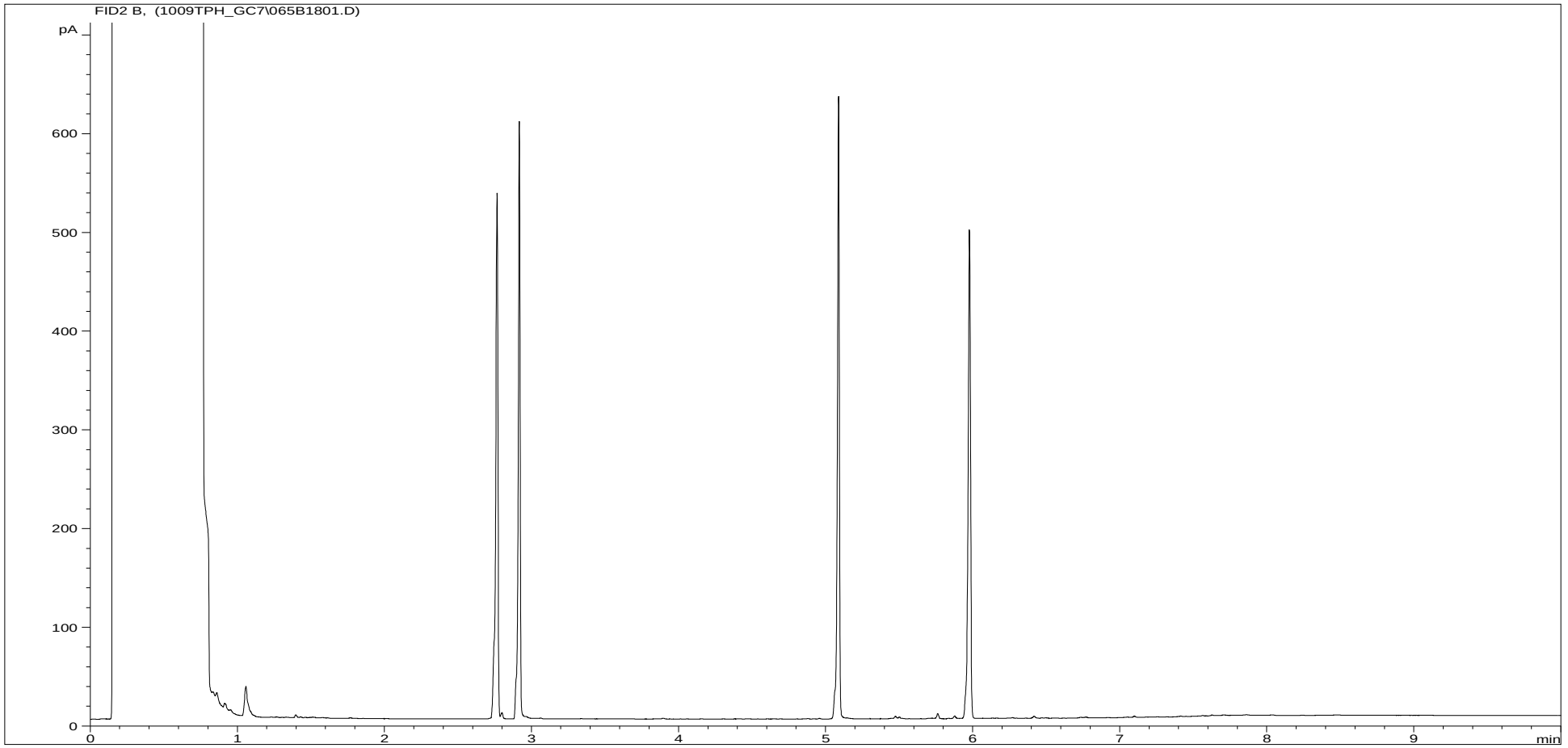
Petroleum Hydrocarbons (C8 to C40) by GC/FID

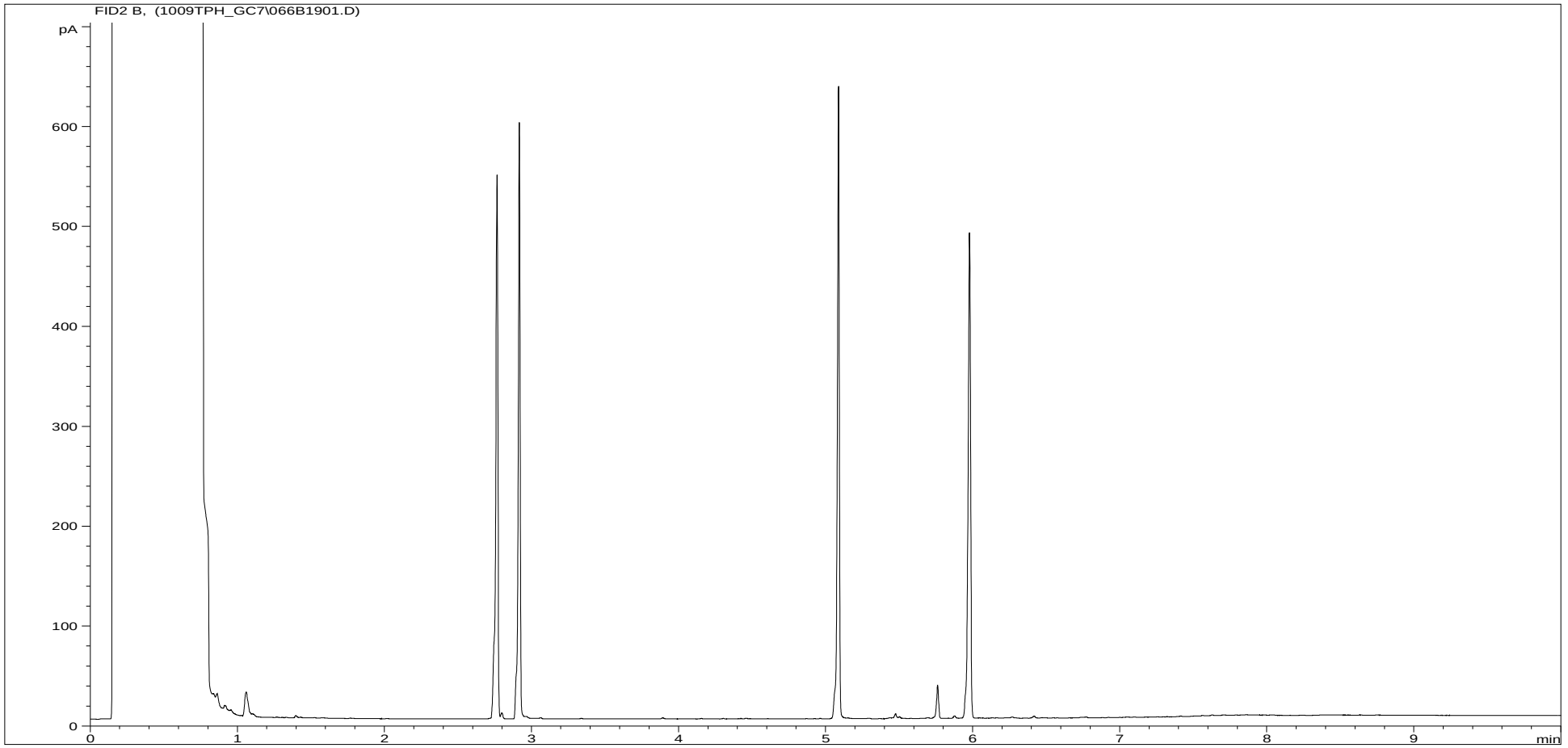


Sample ID:	CL0829256	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH104 ES 9 3.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\065B1801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829257	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH104 ES 13 5.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\066B1901.D		

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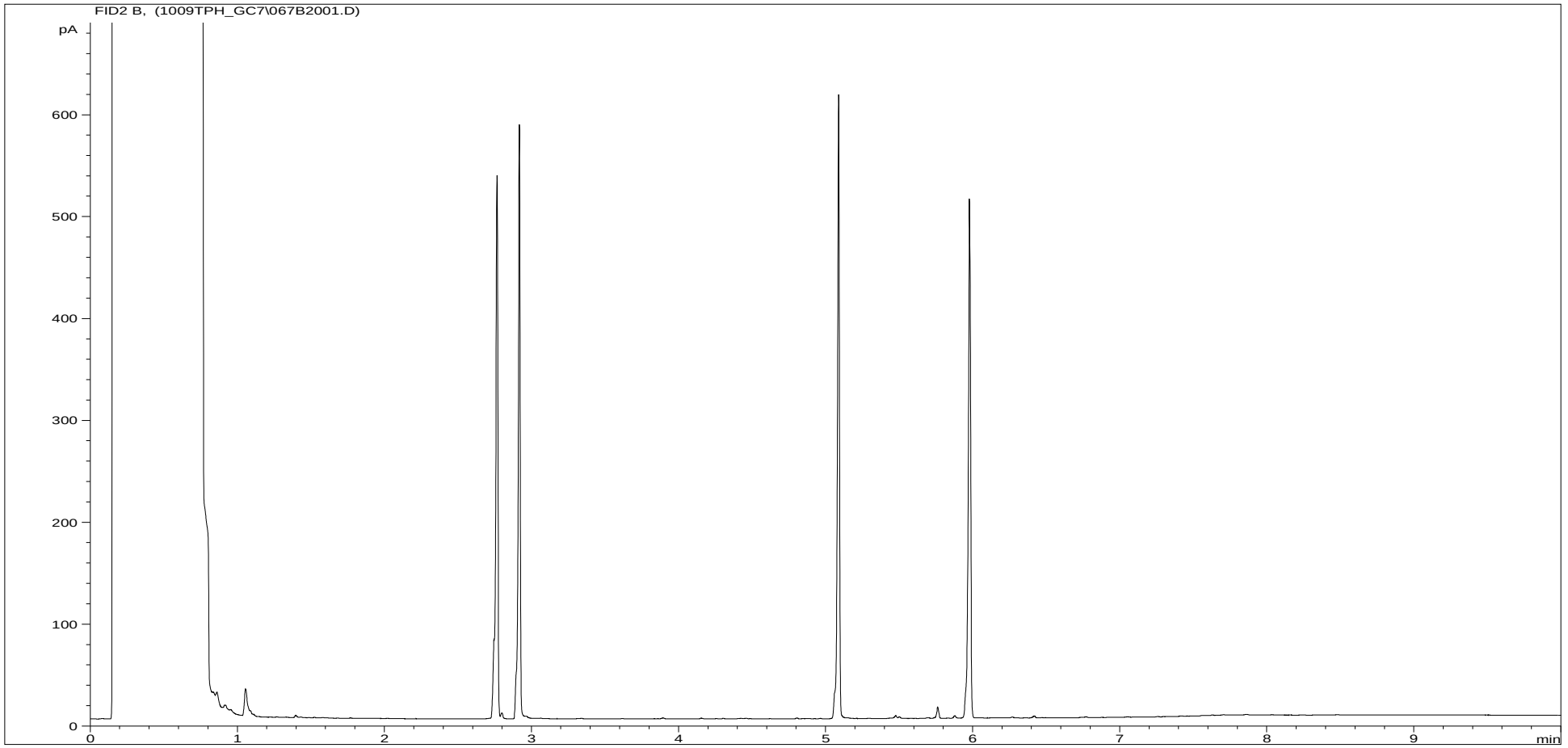
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

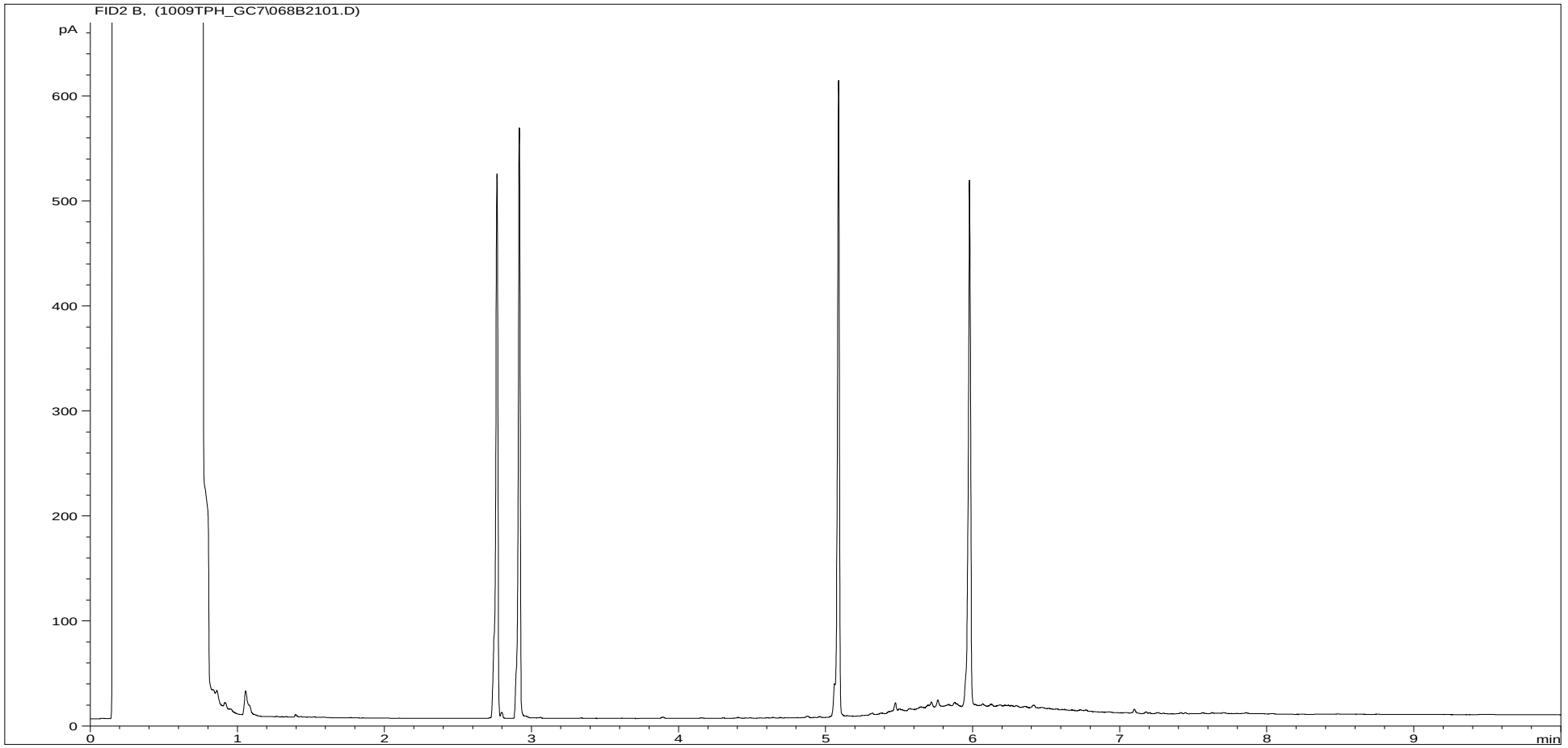


Sample ID:	CL0829258	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH105 ES 6 2.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\067B2001.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829259	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH105 ES 8 3.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\068B2101.D		

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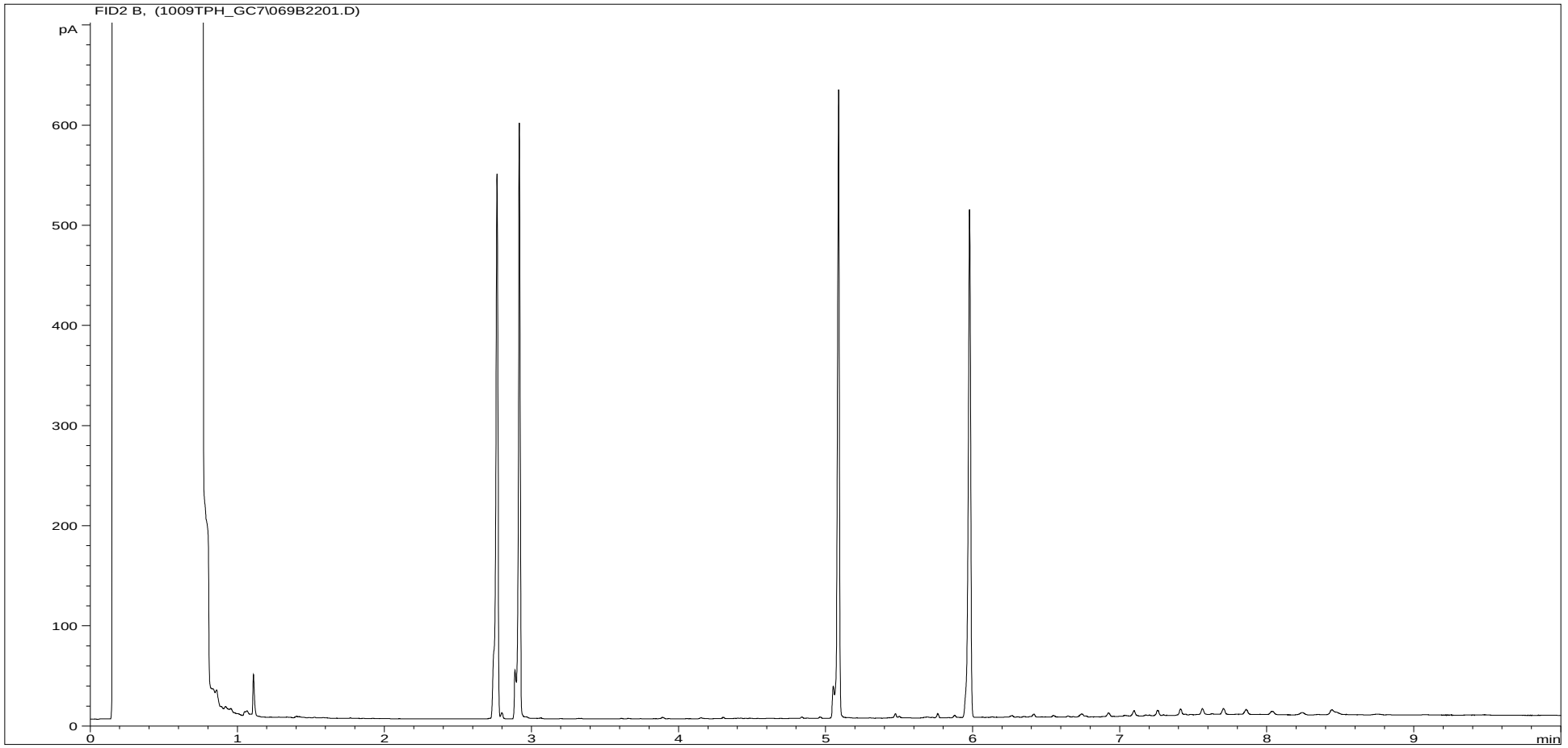
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

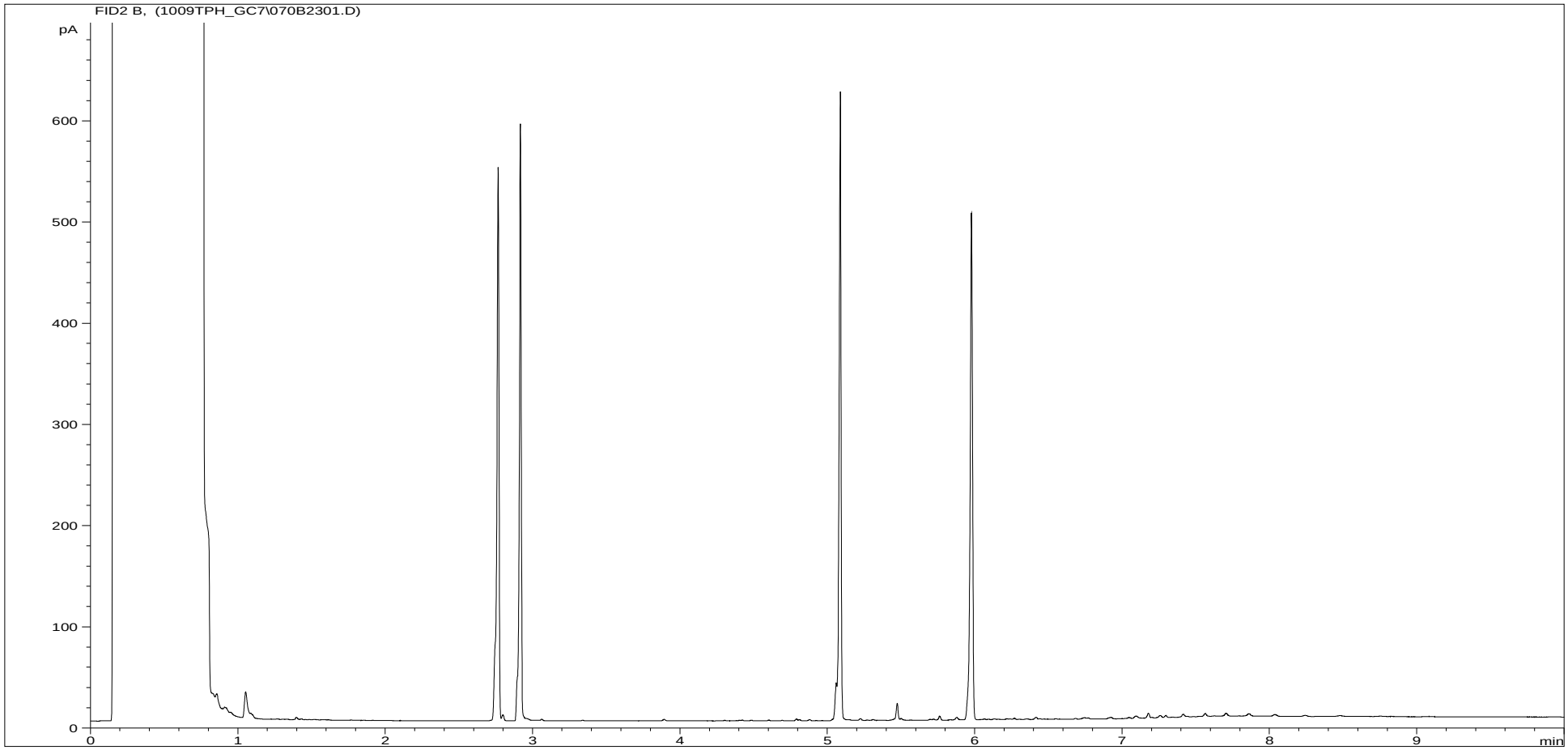


Sample ID:	CL0829260	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH106 ES 10 1.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\069B2201.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

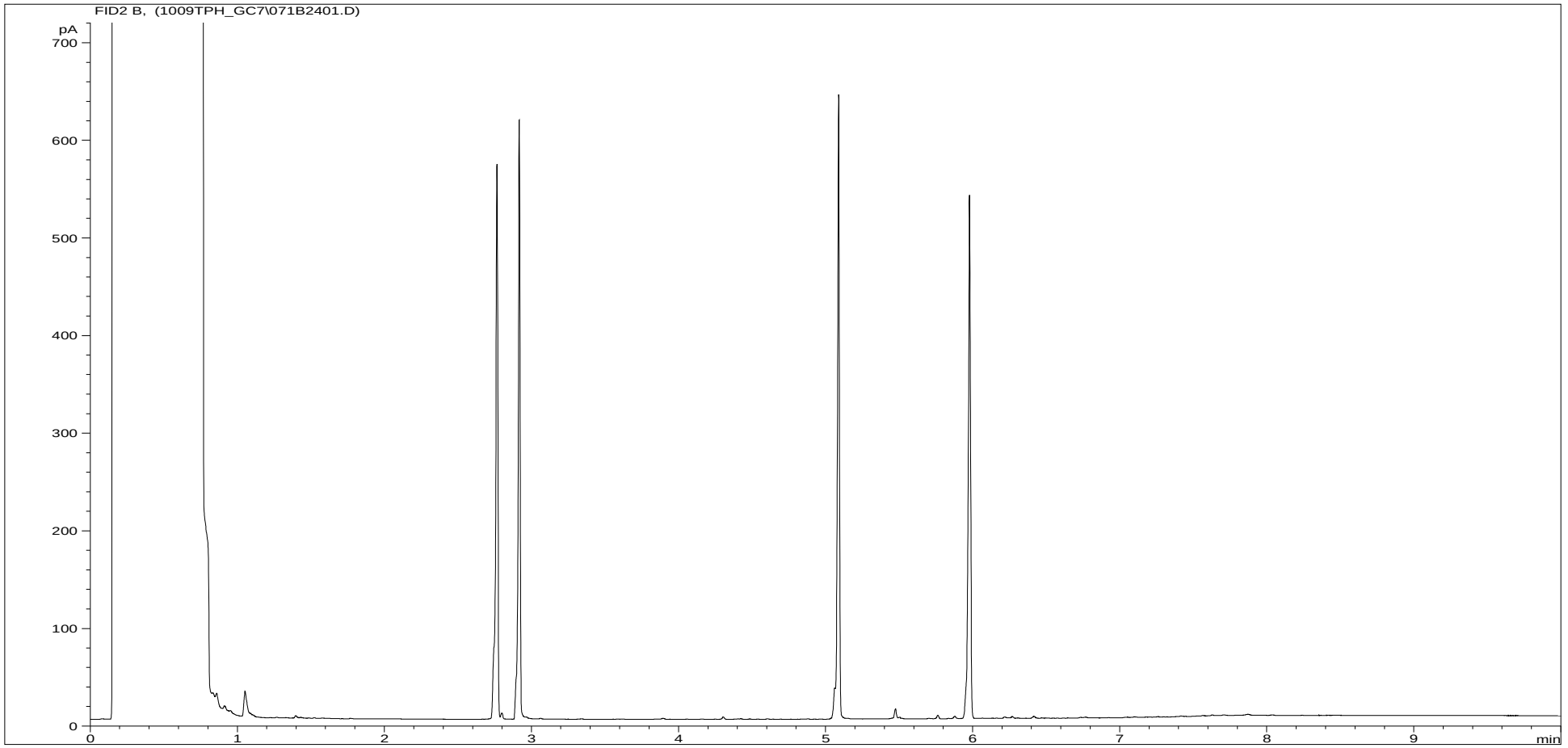


Sample ID:	CL0829261	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH106 ES 7 2.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\070B2301.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

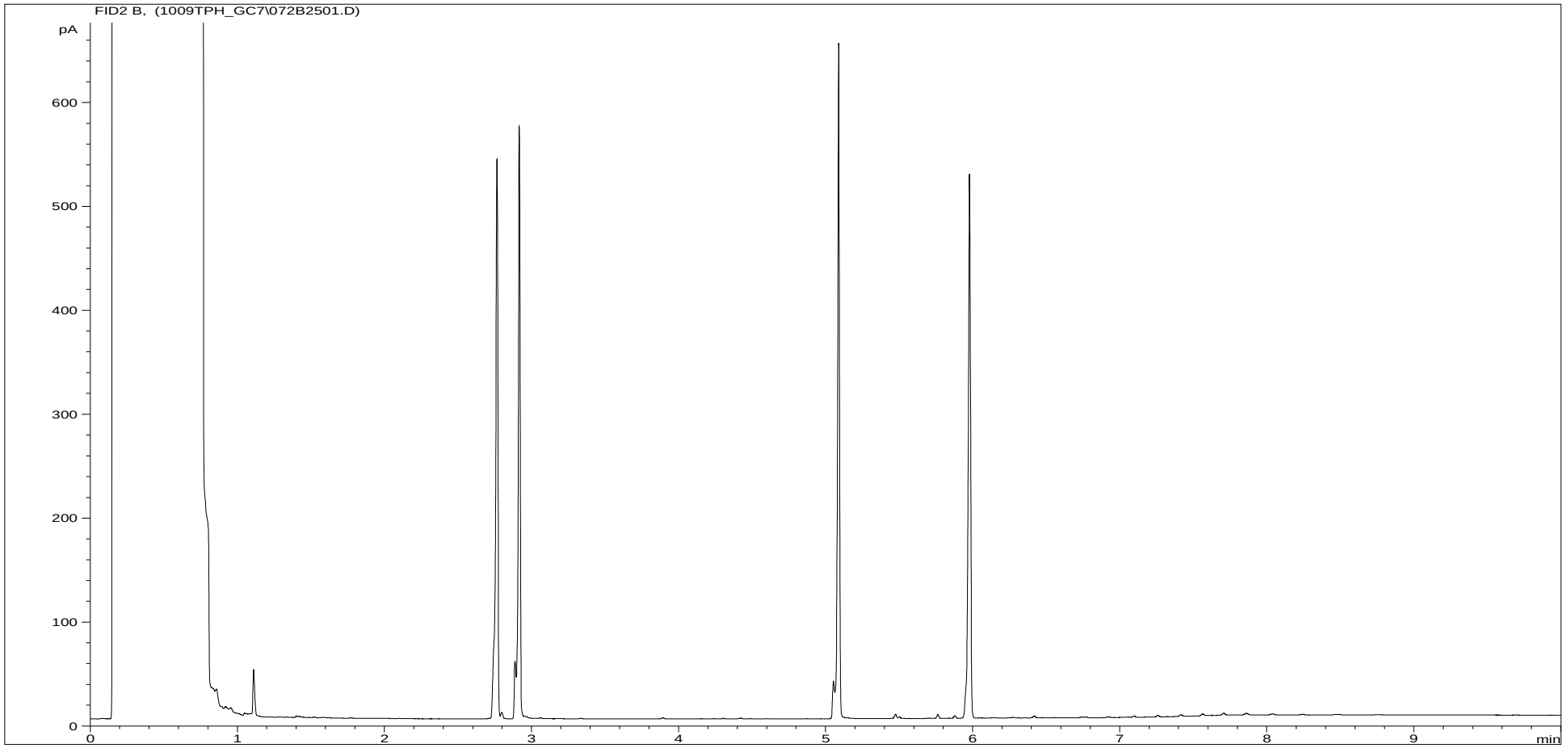


Sample ID:	CL0829262	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH107 ES 2 0.70
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\071B2401.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

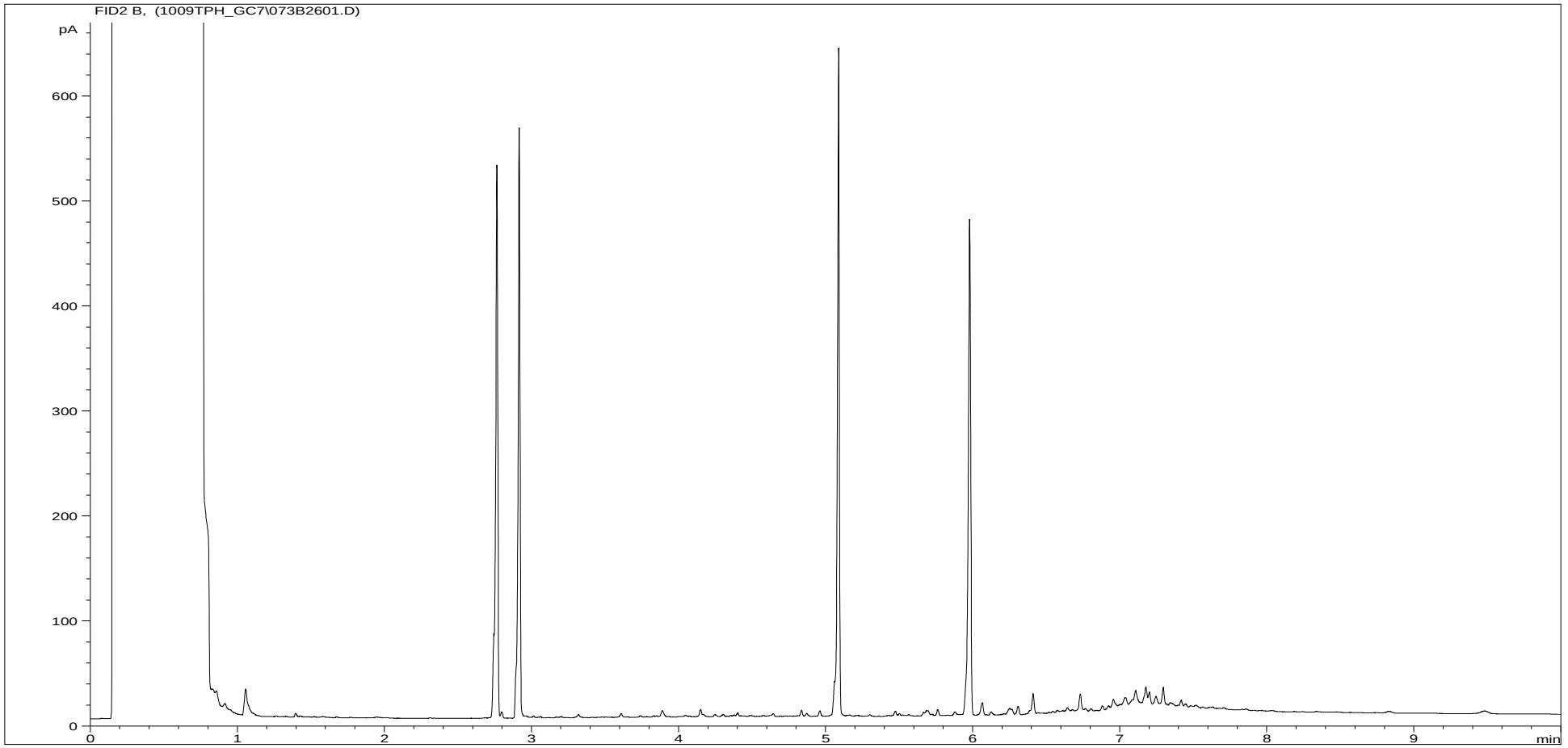


Sample ID:	CL0829263	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH108 ES 2 0.70
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\072B2501.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

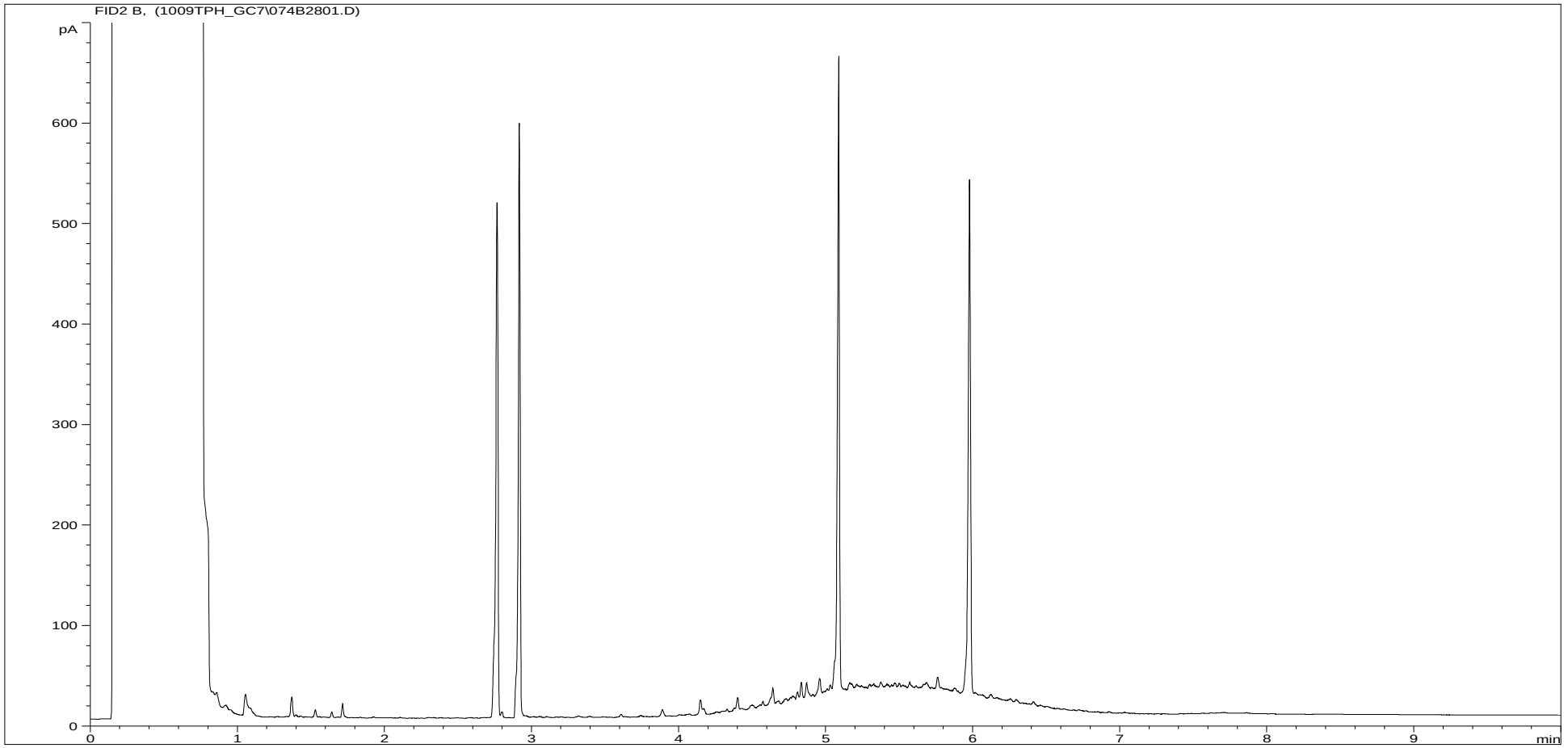


Sample ID:	CL0829264	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH109 ES 1 0.30
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\073B2601.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

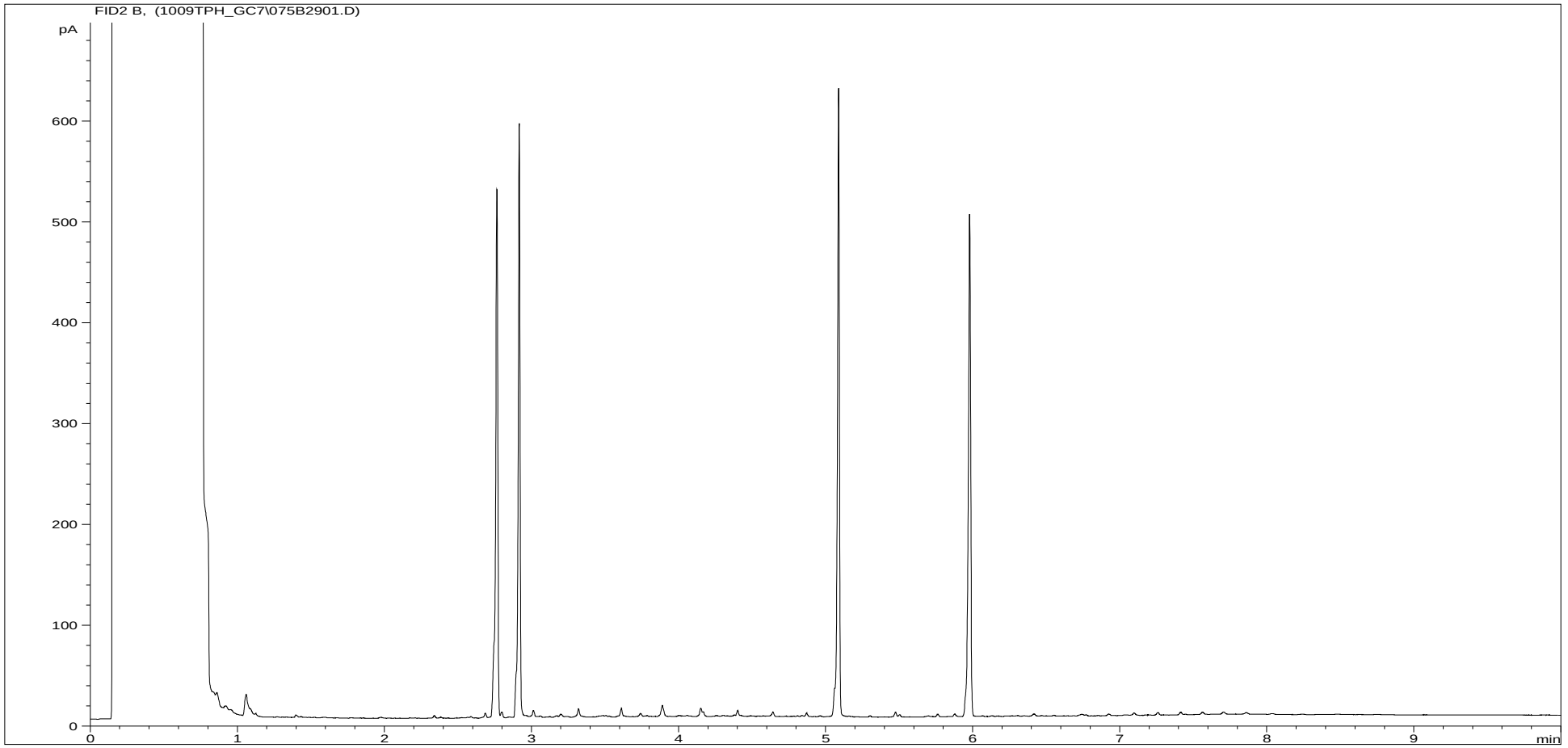


Sample ID:	CL0829265	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH109 ES 6 2.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\074B2801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829266	**Job Number:**	S08_6384M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH101 ES 0.70
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\075B2901.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Report Notes

Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated
Water Soluble Sulphate on 2:1 water:soil extract
AR denotes analysis conducted on the As Received sample

Water analysis specific:
Results expressed as mg/l unless stated otherwise

Oil analysis specific:
Results expressed as mg/kg unless stated otherwise
S.G. expressed as g/cm^3@ 15^{o}C

Filter analysis specific:
Results expressed as mg on filter unless stated otherwise

VOC analysis specific:
Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:
Results expressed as ug/l unless stated otherwise

Air (Carbon tube) analysis specific:
Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibres Observed

General notes:
^ this analysis was subcontracted to another laboratory
$ Within laboratory tolerances
$$ unable to analyse due to nature of sample
¥ Results for guidance only, possible interference
& Blank corrected
I.S insufficient sample for analysis
Intf Unable to analyse due to interferences
N.D Not determined
N.R Not recorded
N.Det Not detected
Req Analysis Requested, see attached sheets for results
Þ Raised detection limit due to nature of sample
***** denotes that all accreditation has been removed by the laboratory for this result.
‡ denotes that Mcerts accreditation has been removed by the laboratory for this result.
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

END OF REPORT

TEST REPORT
SOIL SAMPLE ANALYSIS

1252

TES Report No. EFS/086382M (Ver. 1)

Soil Mechanics
Unit 15
Crosby Yard
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Hirwaun Industrial Estate

The 6 samples described in this report were logged for analysis by TES Bretby on 05-Oct-2008.
The analysis was completed by: 21-Oct-2008

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

On behalf of
TES Bretby :
J Hannah

J. Hannah
Project Co-ordinator

Date of Issue: 21-Oct-2008

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Sample Descriptions

Client : Soil Mechanics

Site : Hirwaun Industrial Estate

Report Number : S08_6382M

Lab ID Number	Client ID	Description
CL/0829232	BH102 ES 0.30	Brown CLAY
CL/0829233	BH102 ES 1.50 (NVM)	Brown Gravel STONE
CL/0829234	BH104 ES 0.70	Brown CLAY
CL/0829235	BH104 ES 1.50	Brown CLAY
CL/0829236	BH105 ES 0.70	Brown CLAY
CL/0829237	BH106 ES 0.30	Brown CLAY

Units :		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg
Method Codes :		ELESULP	ICPACIDS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPSOIL	TMSS	TPHFIDUS	TPHFIDUS
Method Reporting Limits :		20	20	0.5	2	0.1	3	3	3.5	0.10	2.5	0.5	19.5	2	0.2	10.0	10.0
Accreditation Code:		UM	UM	U	UM	U	UM	UM	UM	U	UM	U	UM	U	U	UM	
TES ID Number CL/	**Client Sample Description**	**Elemental Sulphur**	**SO4-- (acid sol)**	**Antimony (MS)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Molybdenum**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**
0829232	BH102 ES 0.30	<20	<20	<0.5	5.2	0.21	11.5‡	10.6	22.5	<0.1	16.8	<0.5	49.4	<1	14.7	<11.7	Req
0829233	BH102 ES 1.50 (NVM)	<19‡	<19‡	<0.5	3.7‡	<0.1	13.5‡	4.2‡	7.6‡	<0.1	7.8‡	<0.5	18.7‡	1	13.9	27‡	Req
0829234	BH104 ES 0.70	<20	<20	<0.5	7.3	0.25	17‡	15.1	17.7	<0.1	20.4	<0.5	56.4	1	16.5	<12.0	Req
0829235	BH104 ES 1.50	<21	<21	<0.5	5	0.14	9.4‡	8.2	9.9	<0.1	14	<0.5	33.9	<1	15.2	<11.8	Req
0829236	BH105 ES 0.70	<21	<21	0.5	5.7	0.2	14.3‡	11.5	13.9	<0.1	15.4	<0.5	52.5	1	14.9	<11.8	Req
0829237	BH106 ES 0.30	<21	215	1.2	11.6	0.8	15.3‡	34	35.1	0.12	22.5	0.5	370.6	<1	20.0	54	Req

TES Bretby

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Fax +44 (0) 1283 554422

Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	21-Oct-08
Report Number	**EFS/086382M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

Units :		pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% M/M			
Method Codes :		WSLM3	ICPBOR	ICPMAJ	KONECL	KONECR	PAHSCUV	SEN9	SFAPI	SFAPI	SFAPI	SFAPI	SFAS	WSLM59			
Method Reporting Limits :			0.5	1	5.0	0.1	10		0.5	0.5	0.5	2	0.5	0.02			
Accreditation Code:		U	N	N	N	N	N	N	N	N	N	N	N	N			
TES ID Number CL/	**Client Sample Description**	**pH units**	**Boron (H20 Soluble)**	**Barium**	**Chloride:**	**Chromium vi:**	**PAH (screening)**	**Asbestos (screening)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Thiocyanate(SCN)(AR)**	**Sulphide as S (AR)**	**F.O.C. %**			
0829232	BH102 ES 0.30	8.2	<0.5	77	10	<0.1	<10	NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.51			
0829233	BH102 ES 1.50 (NVM)	8.4	<0.5	16	15	<0.1	<10	NBFO	<0.6	<0.6	<0.6	<2.3	<0.6	0.16			
0829234	BH104 ES 0.70	8.3	<0.5	158	83	<0.1	<10	NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	0.79			
0829235	BH104 ES 1.50	8.3	<0.5	72	13.3	<0.1	<10	NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	0.37			
0829236	BH105 ES 0.70	8.0	<0.5	85	12.6	<0.1	<11	NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	0.38			
0829237	BH106 ES 0.30	8.2	<0.5	247	30	<0.1	31	NBFO	<0.6	<0.6	<0.6	<2.5	<0.6	1.79			

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	21-Oct-08
Report Number	**EFS/086382M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :		ug/kg	ug/kg	ug/kg	ug/kg												
Method Codes :		BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA												
Method Reporting Limits :		10	10	10	20												
Accreditation Code:		N	N	N	N												
TES ID Number CL/	**Client Sample Description**	**Benzene**	**Toluene**	**Ethyl Benzene**	**Xylenes**												
0829232	BH102 ES 0.30	<12	<12	<12	<23												
0829233	BH102 ES 1.50 (NVM)	<290	<290	<290	<581												
0829234	BH104 ES 0.70	<12	<12	<12	<24												
0829235	BH104 ES 1.50	<12	<12	<12	<24												
0829236	BH105 ES 0.70	<12	<12	<12	<24												
0829237	BH106 ES 0.30	<13	<13	<13	<25												

TES Bretby

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	21-Oct-08
Report Number	**EFS/086382M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

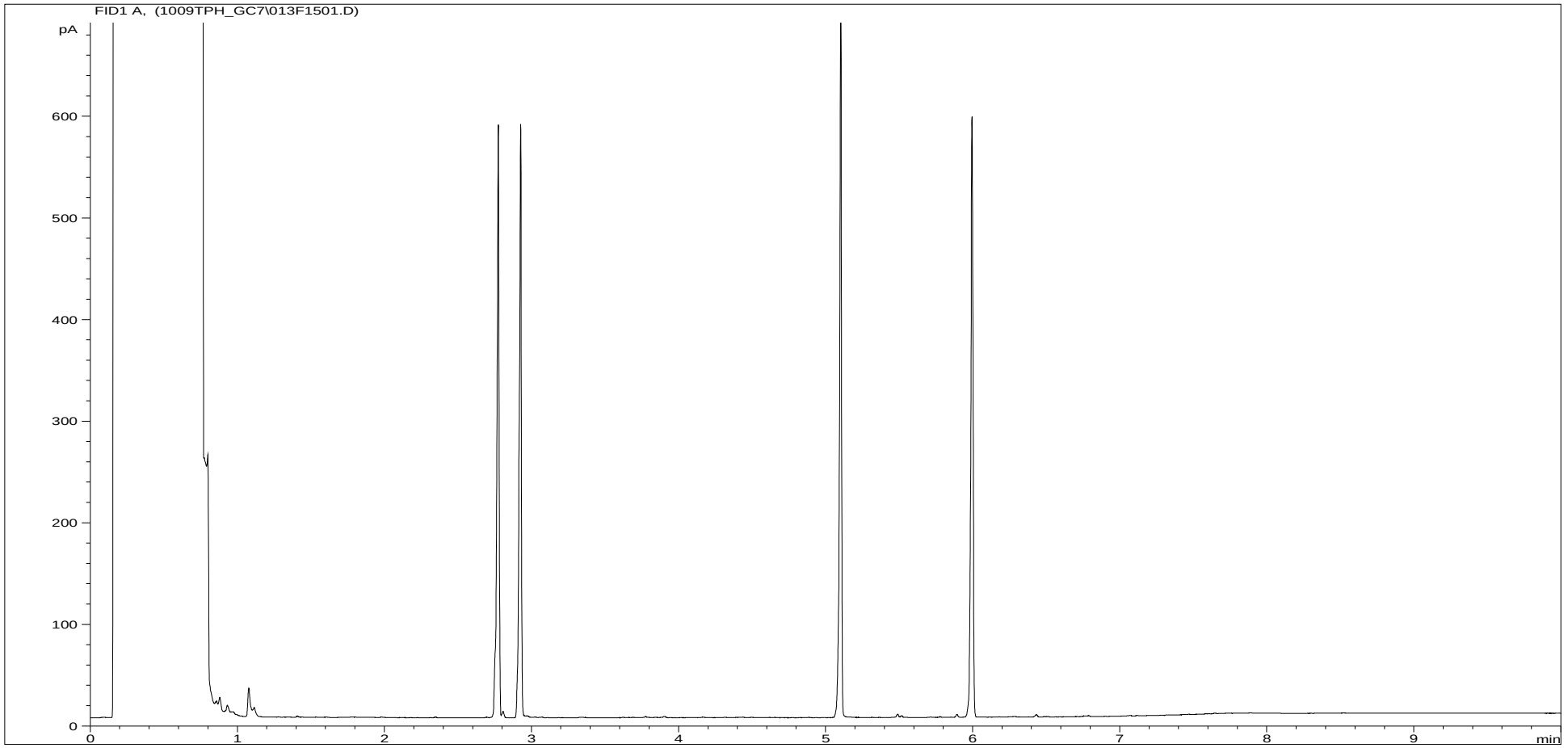
Customer and Site Details: Soil Mechanics : Hirwaun Industrial Estate
Job Number: S08_6382M
QC Batch Number: 83540
Directory: D:\TES\DATA\Y2008\1009TPH_GC7\018F2101.D
Method: Ultra Sonic
Accreditation code: U

Matrix: Soil
Date Booked in: 05-Oct-08
Date Extracted: 08-Oct-08
Date Analysed: 09-Oct-08

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL0829232	BH102 ES 0.30	<2	<2	<2	<2	<5.13
CL0829233	BH102 ES 1.50 (NVM)	<2	<2	<2	<2	21.4
CL0829234	BH104 ES 0.70	<2	<2	<2	2.42	<5.25
CL0829235	BH104 ES 1.50	<2	<2	<2	<2	<5.17
CL0829236	BH105 ES 0.70	<2	<2	<2	<2	<5.15
CL0829237	BH106 ES 0.30	<3	<3	<3	<3	38

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appropriat e, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

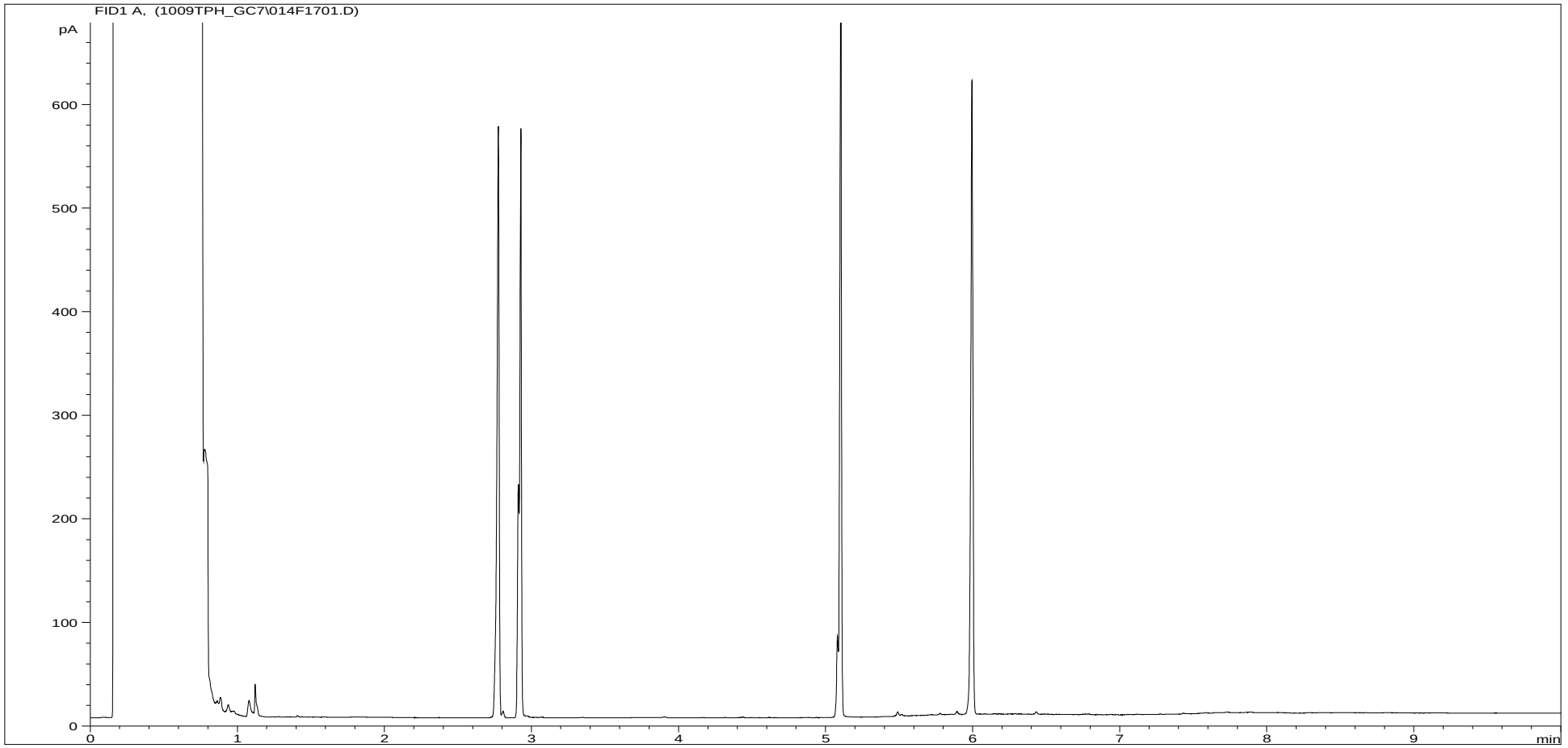


Sample ID:	CL0829232	**Job Number:**	S08_6382M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH102 ES 0.30
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\013F1501.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

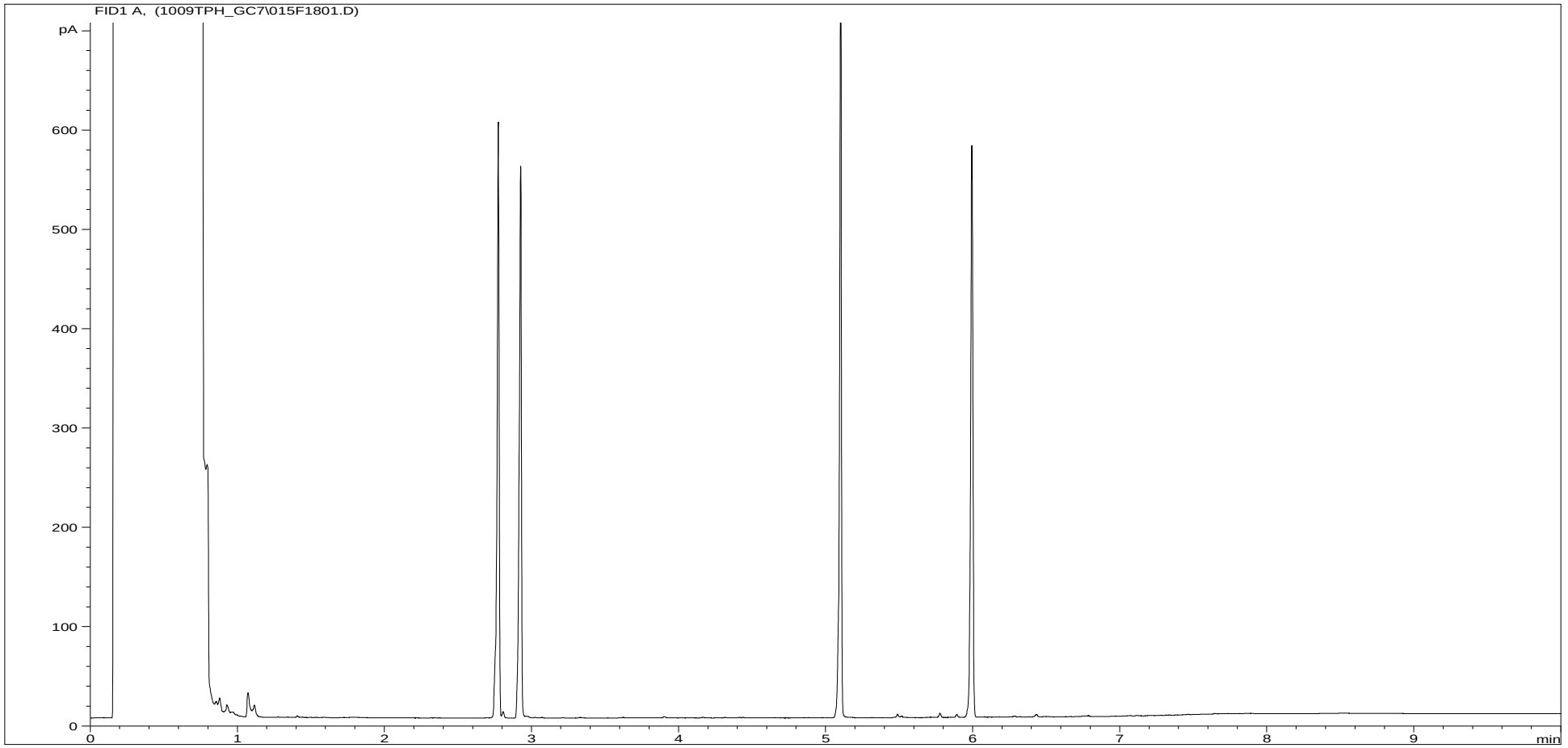


Sample ID:	CL0829233	**Job Number:**	S08_6382M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH102 ES 1.50 (NVM)
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\014F1701.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

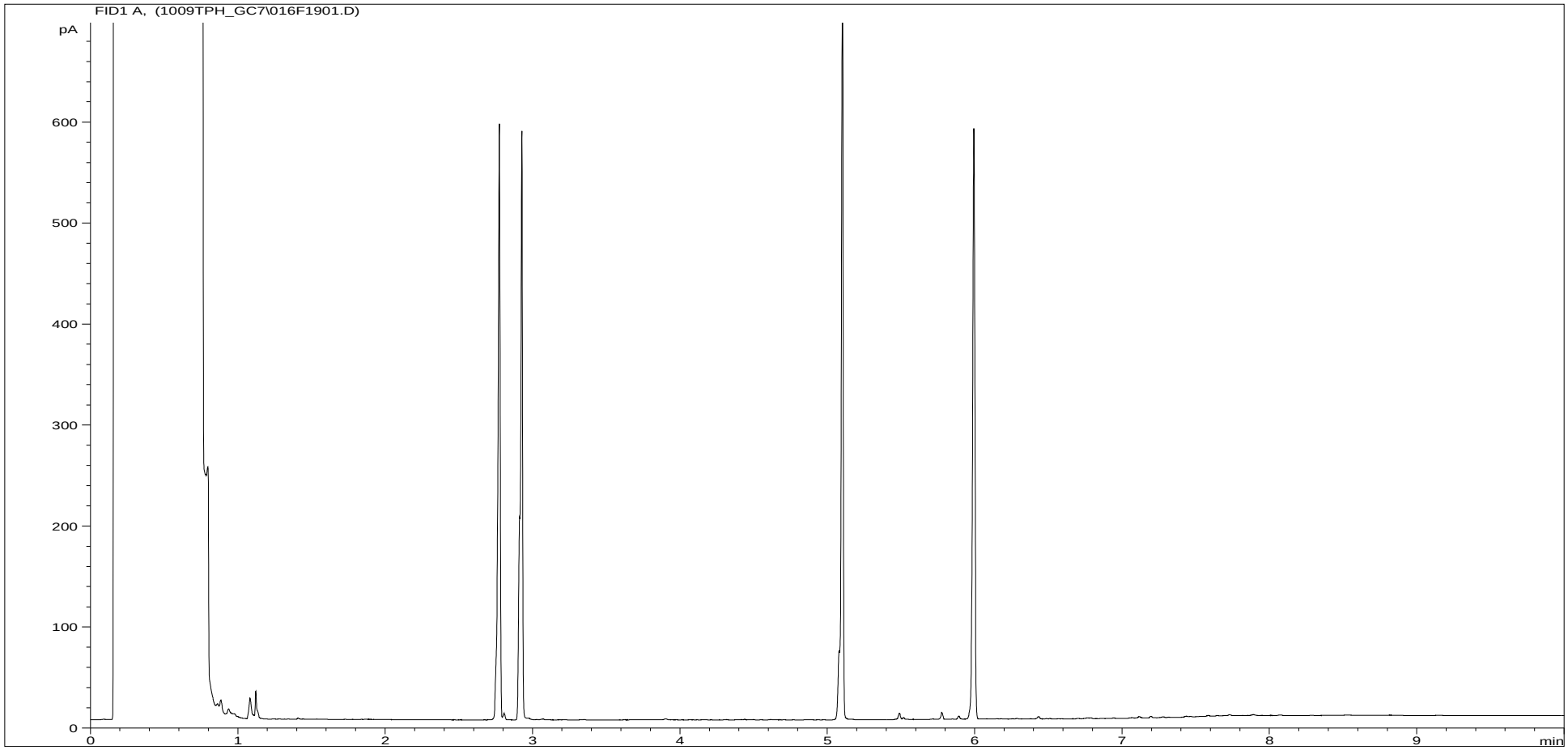


Sample ID:	CL0829234	**Job Number:**	S08_6382M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH104 ES 0.70
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\015F1801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

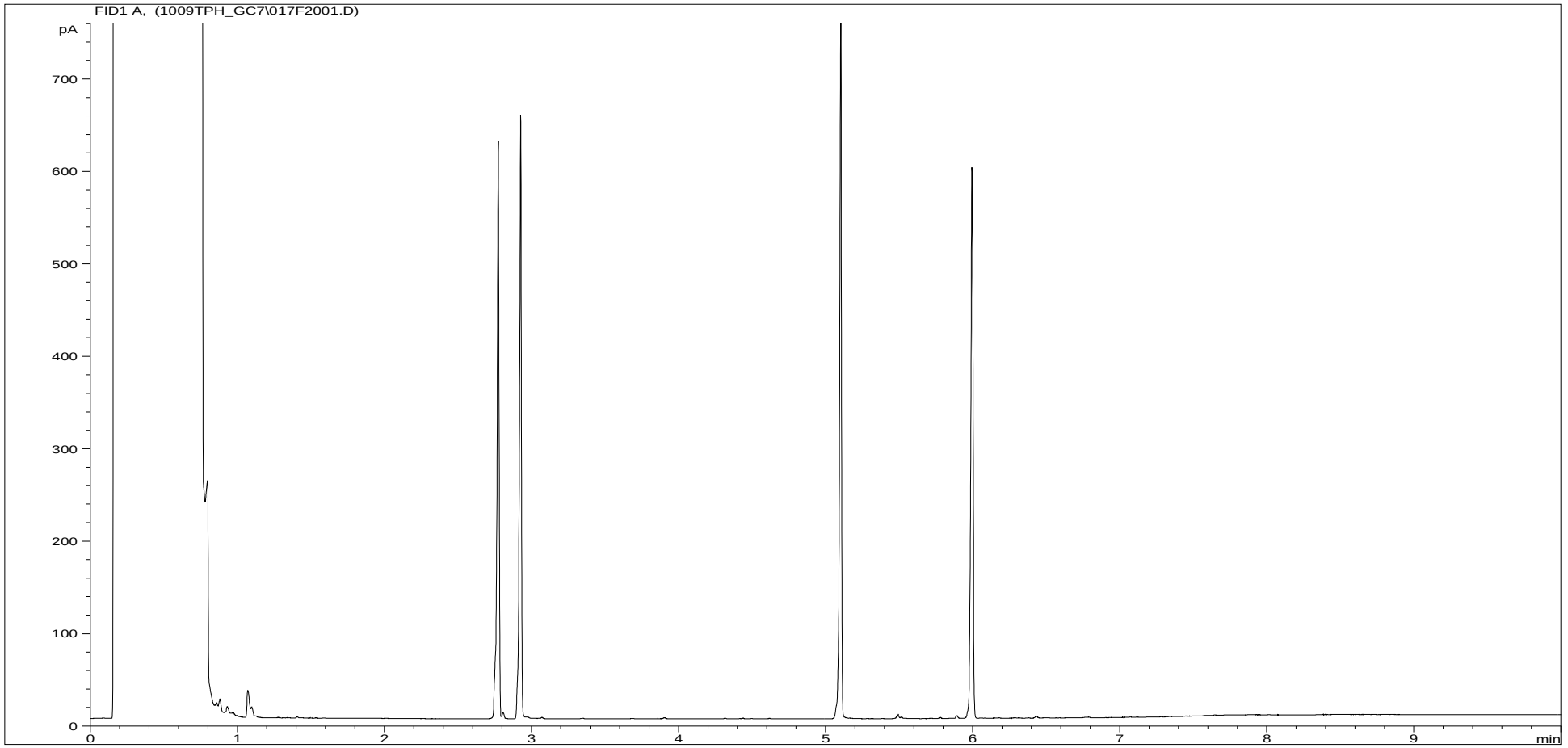


Sample ID:	CL0829235	**Job Number:**	S08_6382M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH104 ES 1.50
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\016F1901.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

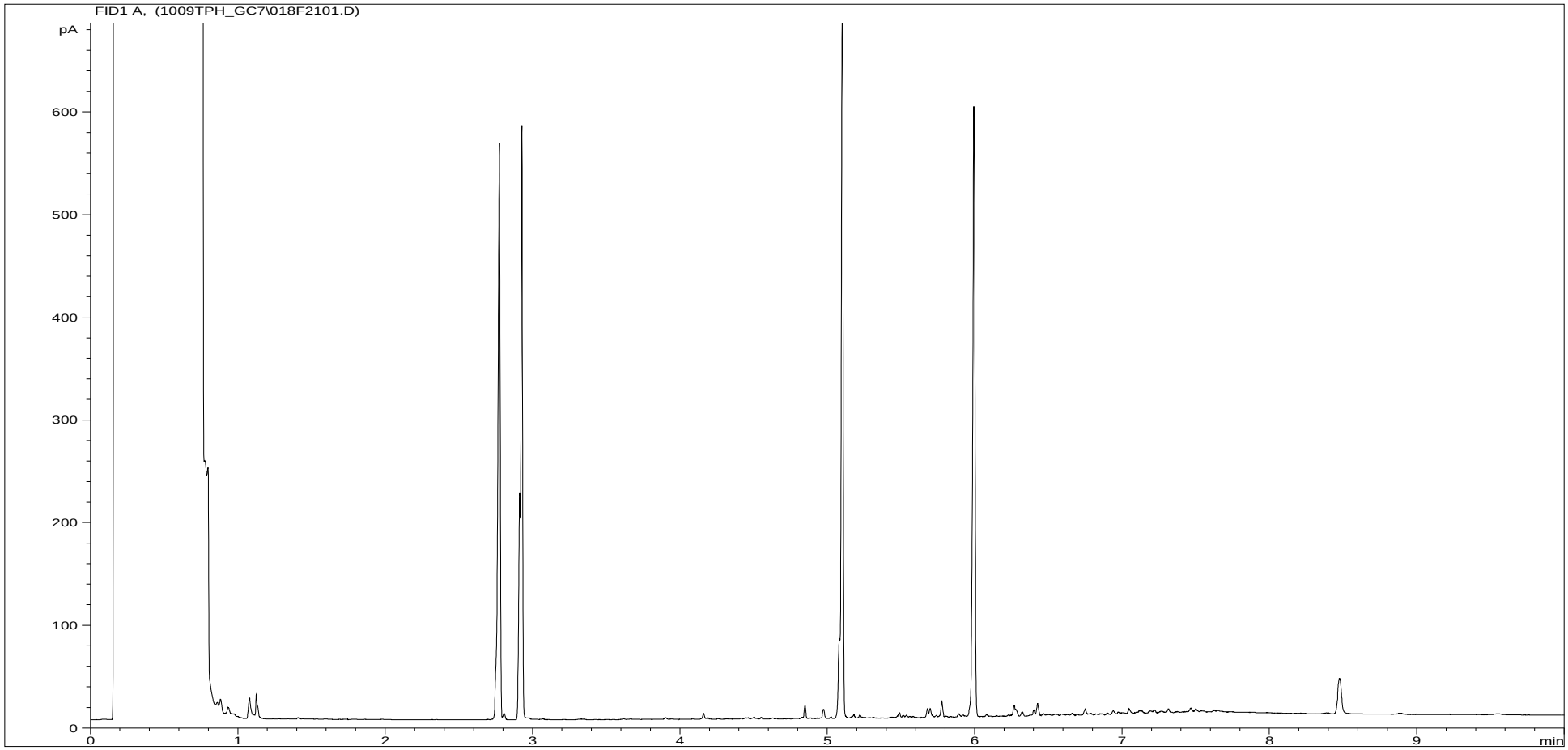


Sample ID:	CL0829236	**Job Number:**	S08_6382M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH105 ES 0.70
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\017F2001.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0829237	**Job Number:**	S08_6382M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	BH106 ES 0.30
Acquisition Date/Time:	09-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1009TPH_GC7\018F2101.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Report Notes

Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated
Water Soluble Sulphate on 2:1 water:soil extract
AR denotes analysis conducted on the As Received sample

Water analysis specific:
Results expressed as mg/l unless stated otherwise

Oil analysis specific:
Results expressed as mg/kg unless stated otherwise
S.G. expressed as g/cm^3@ 15^{o}C

Filter analysis specific:
Results expressed as mg on filter unless stated otherwise

VOC analysis specific:
Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:
Results expressed as ug/l unless stated otherwise

Air (Carbon tube) analysis specific:
Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibres Observed

General notes:
^ this analysis was subcontracted to another laboratory
$ Within laboratory tolerances
$$ unable to analyse due to nature of sample
¥ Results for guidance only, possible interference
& Blank corrected
I.S insufficient sample for analysis
Intf Unable to analyse due to interferences
N.D Not determined
N.R Not recorded
N.Det Not detected
Req Analysis Requested, see attached sheets for results
Þ Raised detection limit due to nature of sample
***** denotes that all accreditation has been removed by the laboratory for this result.
‡ denotes that Mcerts accreditation has been removed by the laboratory for this result.
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

END OF REPORT

TEST REPORT
SOIL SAMPLE ANALYSIS

1252

TES Report No. EFS/085713M (Ver. 1)

Soil Mechanics
Unit 15
Crosby Yard
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Hirwaun Industrial Estate

The 11 samples described in this report were logged for analysis by TES Bretby on 05-Sep-2008.
The analysis was completed by: 26-Sep-2008

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

On behalf of
TES Bretby :
J Hannah

J. Hannah

Project Co-ordinator

Date of Issue: 26-Sep-2008

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Sample Descriptions

Client : Soil Mechanics

Site : Hirwaun Industrial Estate

Report Number : S08_5713M

Lab ID Number	Client ID	Description
CL/0826248	TP11 ES 4 2.30	Brown CLAY
CL/0826249	TP11A ES 2 0.50	Brown Stone SILT
CL/0826250	TP12 ES 1 0.30	Brown Stone SILT
CL/0826251	TP12A ES 1 0.20	Brown MADE GROUND
CL/0826252	TP14 ES 1 0.30	Brown Stone CLAY
CL/0826253	TP15 ES 1 0.30	Brown Stone CLAY
CL/0826254	TP15 ES 2 0.70	Brown Stone CLAY
CL/0826255	TP16 ES 1 0.30 (NVM)	Brown Gravel STONE
CL/0826256	TP16 ES 2 1.00	Brown Stone CLAY
CL/0826257	TP17 ES 1 0.30	Brown Stone CLAY
CL/0826258	TP17 ES 3 1.20	Brown Stone CLAY

Units :		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg
Method Codes :		ELESULP	ICPACIDS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	TMSS	TPHFIDUS	TPHFIDUS
Method Reporting Limits :		20	20	0.1	2	0.1	3	3	3.5	0.10	0.5	2.5	0.5	19.5	0.2	10.0	10.0
Accreditation Code:		UM	UM	U	UM	U	UM	UM	UM	U	U	UM	U	UM	U	UM	
TES ID Number CL/	**Client Sample Description**	**Elemental Sulphur**	**SO4-- (acid sol)**	**Antimony (MS)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Molybdenum (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**
0826249	TP11A ES 2 0.50	<21	273	<0.5	7.9	0.14	12.0‡	16	21.2	<0.1	<0.5	19	<0.5	57.7	12.7	<11.5	Req
0826248	TP11 ES 4 2.30	<20	348	<0.5	5.3	0.14	16.4‡	12.9	19.7	<0.1	<0.5	22	<0.5	65.4	16.0	<11.9	Req
0826251	TP12A ES 1 0.20	<20	485	0.5	13.9	0.43	12.9‡	26.5	34.3	<0.1	<0.5	21	0.6	212.4	18.0	61	Req
0826250	TP12 ES 1 0.30	<21	82	<0.5	5.4	<0.1	12.1‡	12.7	46.9	<0.1	<0.5	22.1	<0.5	54.1	11.6	<11.3	Req
0826252	TP14 ES 1 0.30	<20	387	<0.5	10.1	0.37	15.1‡	20.8	28.5	<0.1	<0.5	17	<0.5	97.9	20.7	63	Req
0826253	TP15 ES 1 0.30	61	849	<0.5	8.5	0.32	15.3‡	20.4	25.3	<0.1	<0.5	15.6	0.5	92.1	21.5	<12.7	Req
0826254	TP15 ES 2 0.70	<21	1540	1.2	7.6	0.76	15.7‡	20	52	<0.1	0.6	12.8	<0.5	73.9	19.0	114	Req
0826255	TP16 ES 1 0.30 (NVM)	306‡	1740‡	<0.5	9.4‡	0.2	22.5‡	13.3‡	54‡	<0.1	<0.5	11.7‡	1.4	34.6‡	16.6	<12.0‡	Req
0826256	TP16 ES 2 1.00	<21	408	<0.5	8	0.12	15.5‡	19.7	21.2	<0.1	<0.5	28.2	<0.5	58.6	17.9	12.2	Req
0826257	TP17 ES 1 0.30	<21	274	<0.5	11.2	0.2	14‡	19.1	23.6	<0.1	<0.5	19.6	<0.5	57.9	20.9	16.4	Req
0826258	TP17 ES 3 1.20	<21	609	<0.5	11.2	0.2	13.4‡	17.1	27	<0.1	<0.5	17.2	0.8	40.1	21.8	50	Req

TES Bretby

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	26-Sep-08
Report Number	**EFS/085713M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :		pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	æg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% M/M		
Method Codes :		WSLM3	ICPBOR	ICPMAJ	KONECL	KONECR	PAHSCUV	PCBUSECD	SEN9	SFAPI	SFAPI	SFAPI	SFAPI	SFAS	WSLM59		
Method Reporting Limits :			0.5	1	5.0	0.1	10			0.5	0.5	0.5	2	0.5	0.02		
Accreditation Code:		U	N	N	N	N	N		N	N	N	N	N	N	N		
TES ID Number CL/	**Client Sample Description**	**pH units**	**Boron (H20 Soluble)**	**Barium**	**Chloride:**	**Chromium vi:**	**PAH (screening)**	**PCB (12 Congeners)**	**Asbestos (screening)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Thiocyanate(SCN)(AR)**	**Sulphide as S (AR)**	**F.O.C. %**		
0826249	TP11A ES 2 0.50	7.7	<0.5	<0.1	14.4	<0.1	<10			<0.6	<0.6	<0.6	<2.3	<0.6	0.32		
0826248	TP11 ES 4 2.30	8.3	0.7	225	101	<0.1	16	Req	NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	0.54		
0826251	TP12A ES 1 0.20	8.0	0.6	141	22	<0.1	16		NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	2.28		
0826250	TP12 ES 1 0.30	7.3	<0.5	<0.1	14.5	<0.1	<10			<0.6	<0.6	<0.6	<2.3	<0.6	0.25		
0826252	TP14 ES 1 0.30	7.7	<0.5	140	15.2	<0.1	20		NBFO	<0.6	<0.6	<0.6	<2.5	<0.6	2.51		
0826253	TP15 ES 1 0.30	9.5	0.6	334	36	<0.1	30	Req	NBFO	<0.6	<0.6	<0.6	<2.5	<0.6	1.77		
0826254	TP15 ES 2 0.70	8.3	0.5	198	20	<0.1	23		NBFO	<0.6	<0.6	<0.6	<2.5	<0.6	3.07		
0826255	TP16 ES 1 0.30 (NVM)	10.1	2.3	420	102	<0.1	123		NBFO	<0.6	<0.6	<0.6	<2.4	<0.6	3.16		
0826256	TP16 ES 2 1.00	7.5	<0.5	169	40	<0.1	12			<0.6	<0.6	<0.6	<2.4	<0.6	0.49		
0826257	TP17 ES 1 0.30	7.8	<0.5	76	22	<0.1	12		NBFO	<0.6	<0.6	<0.6	<2.5	<0.6	1.56		
0826258	TP17 ES 3 1.20	7.6	<0.5	192	27	<0.1	12		NBFO	<0.6	<0.6	<0.6	<2.6	<0.6	2.11		

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Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	26-Sep-08
Report Number	**EFS/085713M**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

Units :		ug/kg	ug/kg	ug/kg	ug/kg												
Method Codes :		BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA												
Method Reporting Limits :		10	10	10	20												
Accreditation Code:		N	N	N	N												
TES ID Number CL/	**Client Sample Description**	**Benzene**	**Toluene**	**Ethyl Benzene**	**Xylenes**												
0826249	TP11A ES 2 0.50	<11	<11	<11	<23												
0826248	TP11 ES 4 2.30	<12	<12	<12	<24												
0826251	TP12A ES 1 0.20	<12	<12	<12	<24												
0826250	TP12 ES 1 0.30	<11	<11	<11	<23												
0826252	TP14 ES 1 0.30	<32	<32	<32	<63												
0826253	TP15 ES 1 0.30	<13	<13	<13	<25												
0826254	TP15 ES 2 0.70	<12	<12	<12	<25												
0826255	TP16 ES 1 0.30 (NVM)	<12	<12	<12	<24												
0826256	TP16 ES 2 1.00	<12	<12	<12	<24												
0826257	TP17 ES 1 0.30	<32	<32	<32	<63												
0826258	TP17 ES 3 1.20	<13	<13	<13	<26												

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Contact Mr H Woodroffe

Hirwaun Industrial Estate

Soils Sample Analysis

Date Printed	26-Sep-08
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Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: Soil Mechanics: Hirwaun Industrial Estate
Job Number: S08_5713M
QC Batch Number: 083204
Directory: 0910PCB.GC11
Method: Ultrasonic
Accreditation code: N

Matrix: Soil
Date Booked in: 05-Sep-08
Date Extracted: 09-Sep-08
Date Analysed: 10-Sep-08

		Concentration, (µg/kg)											
Sample ID	**Customer ID**	**PCB 81**	**PCB 77**	**PCB 123**	**PCB 118**	**PCB 114**	**PCB 105**	**PCB 126**	**PCB 167**	**PCB 156**	**PCB 157**	**PCB 169**	**PCB 189**
* CL0826248	TP11 ES 4 2.30	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9
* CL0826253	TP15 ES 1 0.30	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

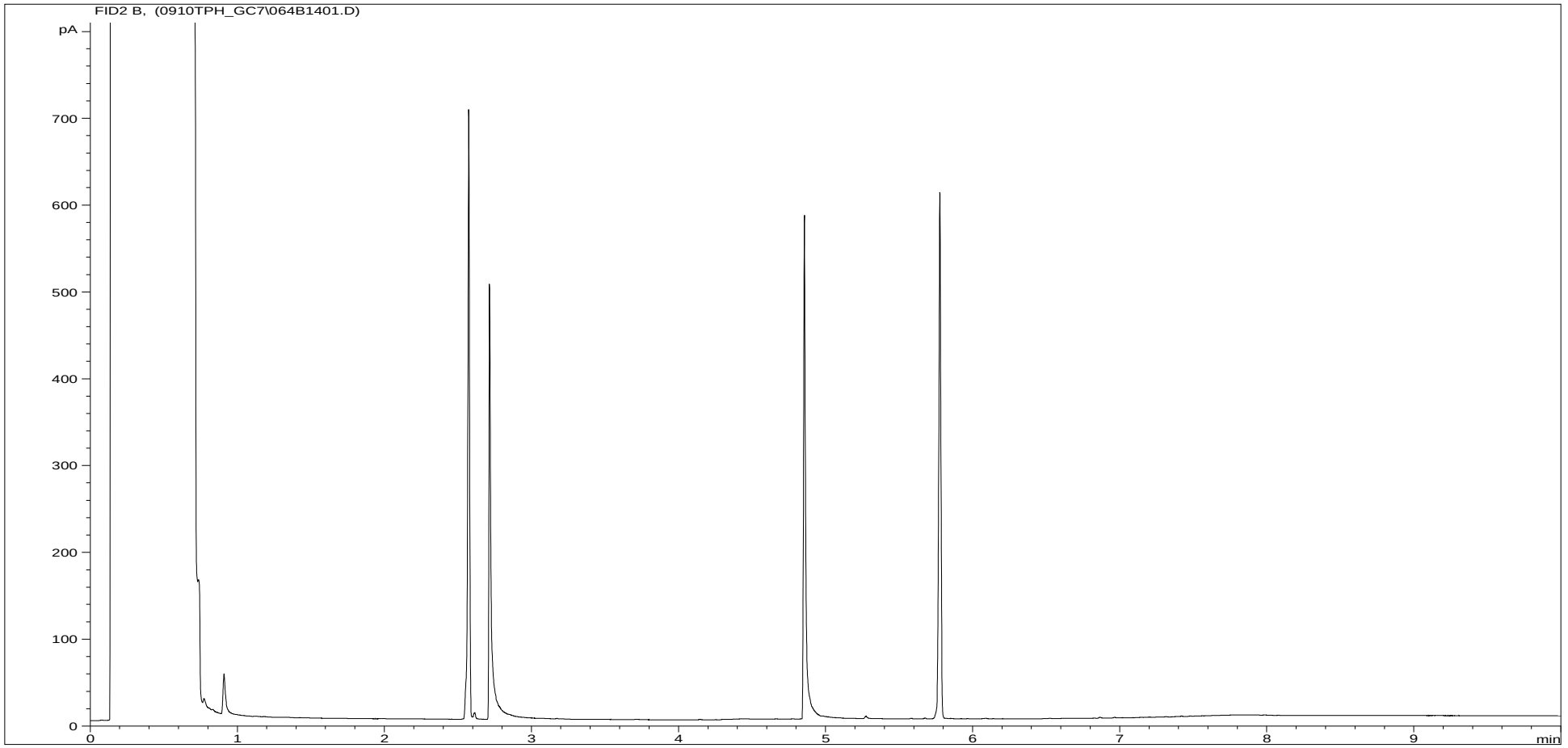
Customer and Site Details: Soil Mechanics : Hirwaun Industrial Estate
Job Number: S08_5713M
QC Batch Number: 83209
Directory: D:\TES\DATA\Y2008\0910TPH_GC7\074B2501.D
Method: Ultra Sonic
Accreditation code: U

Matrix: Soil
Date Booked in: 05-Sep-08
Date Extracted: 09-Sep-08
Date Analysed: 10-Sep-08

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL0826248	TP11 ES 4 2.30	<2	<2	<2	<2	<5.21
CL0826249	TP11A ES 2 0.50	<2	<2	3.06	<2	<5.02
CL0826250	TP12 ES 1 0.30	<2	<2	2.64	<2	<4.95
CL0826251	TP12A ES 1 0.20	<2	<2	2	<2	37.2
CL0826252	TP14 ES 1 0.30	<3	<3	<3	2.62	37.6
CL0826253	TP15 ES 1 0.30	<3	<3	3.03	<3	<5.58
CL0826254	TP15 ES 2 0.70	<2	<2	4.51	<2	65.8
CL0826255	TP16 ES 1 0.30 (NVM)	<2	<2	2.43	<2	6.87
CL0826256	TP16 ES 2 1.00	<2	<2	3.23	<2	6.59
CL0826257	TP17 ES 1 0.30	<3	<3	3.11	<3	7.37
CL0826258	TP17 ES 3 1.20	<3	<3	<3	<3	26.7

Where individual results are flagged see report notes for for status.
Results corrected to dry weight at 105℃ where appropriat e, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

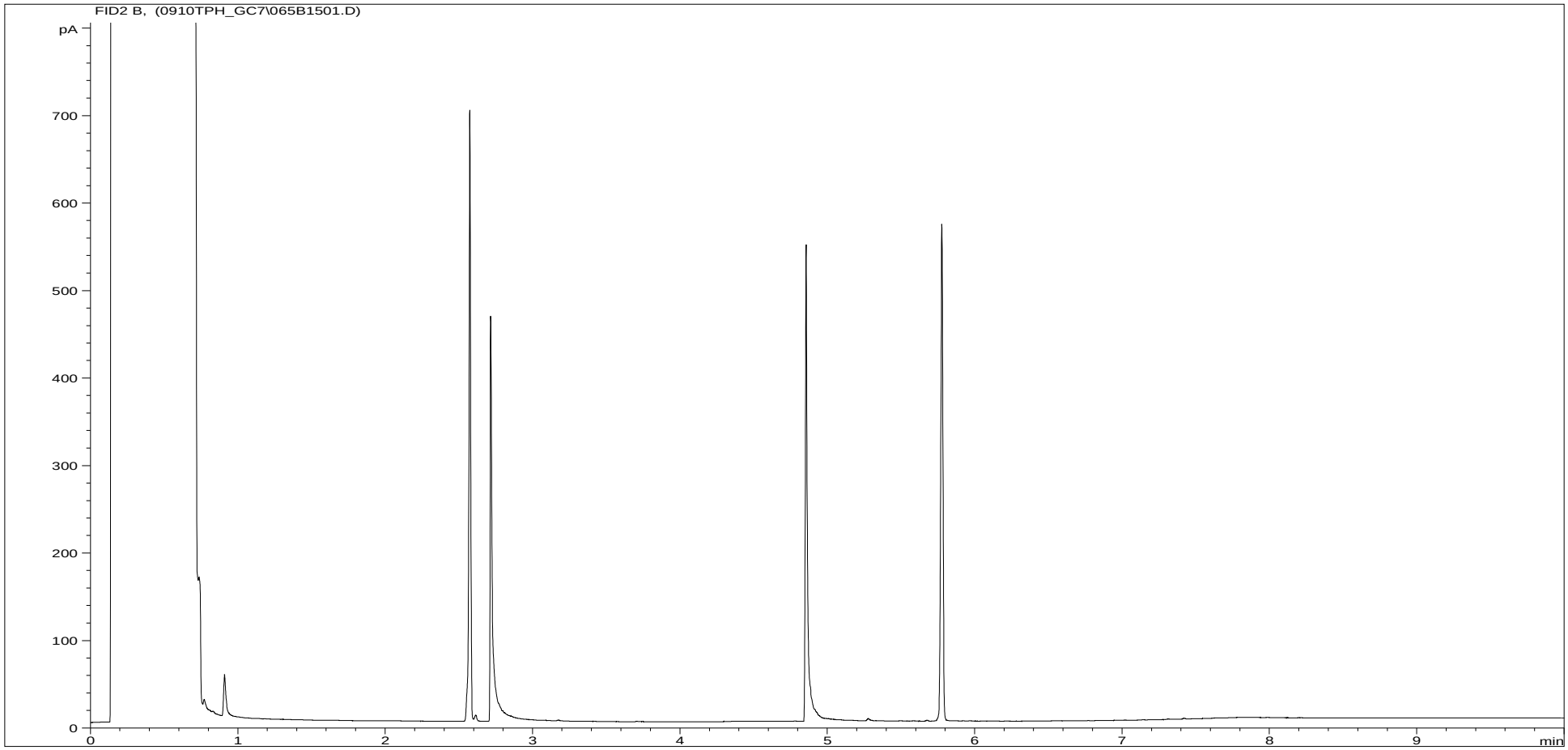


Sample ID:	CL0826248	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP11 ES 4 2.30
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\064B1401.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

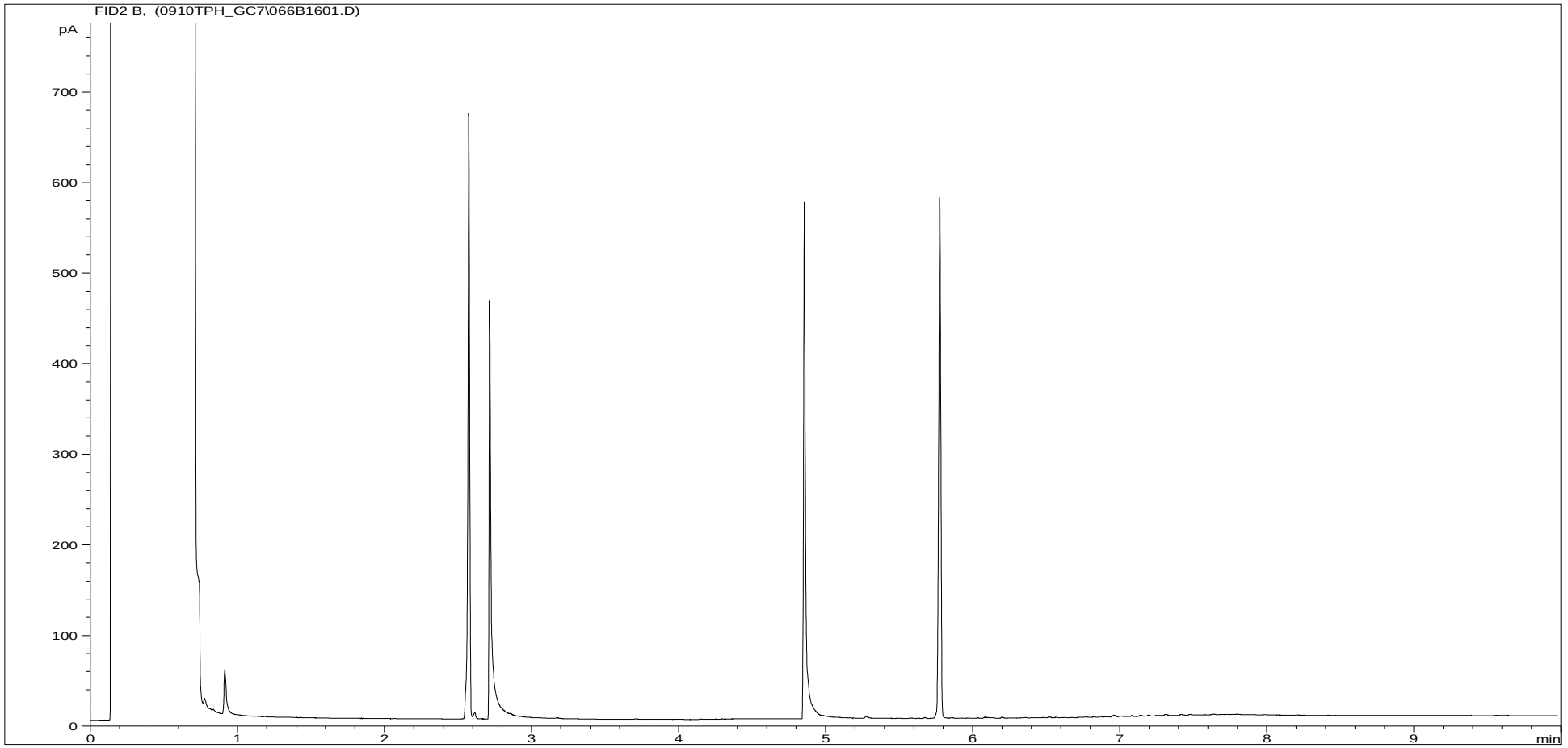


Sample ID:	CL0826249	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP11A ES 2 0.50
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\065B1501.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

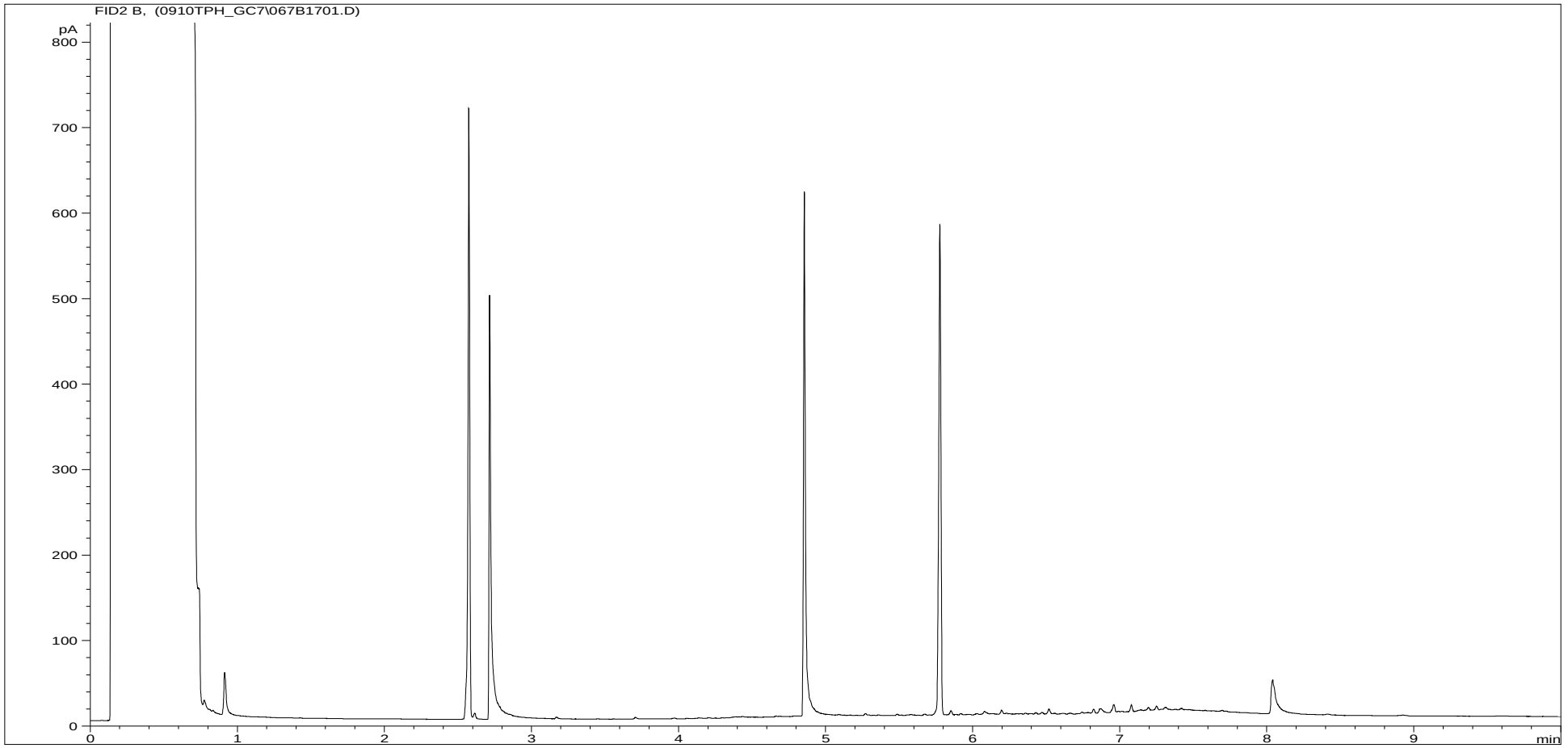


Sample ID:	CL0826250	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP12 ES 1 0.30
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\066B1601.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

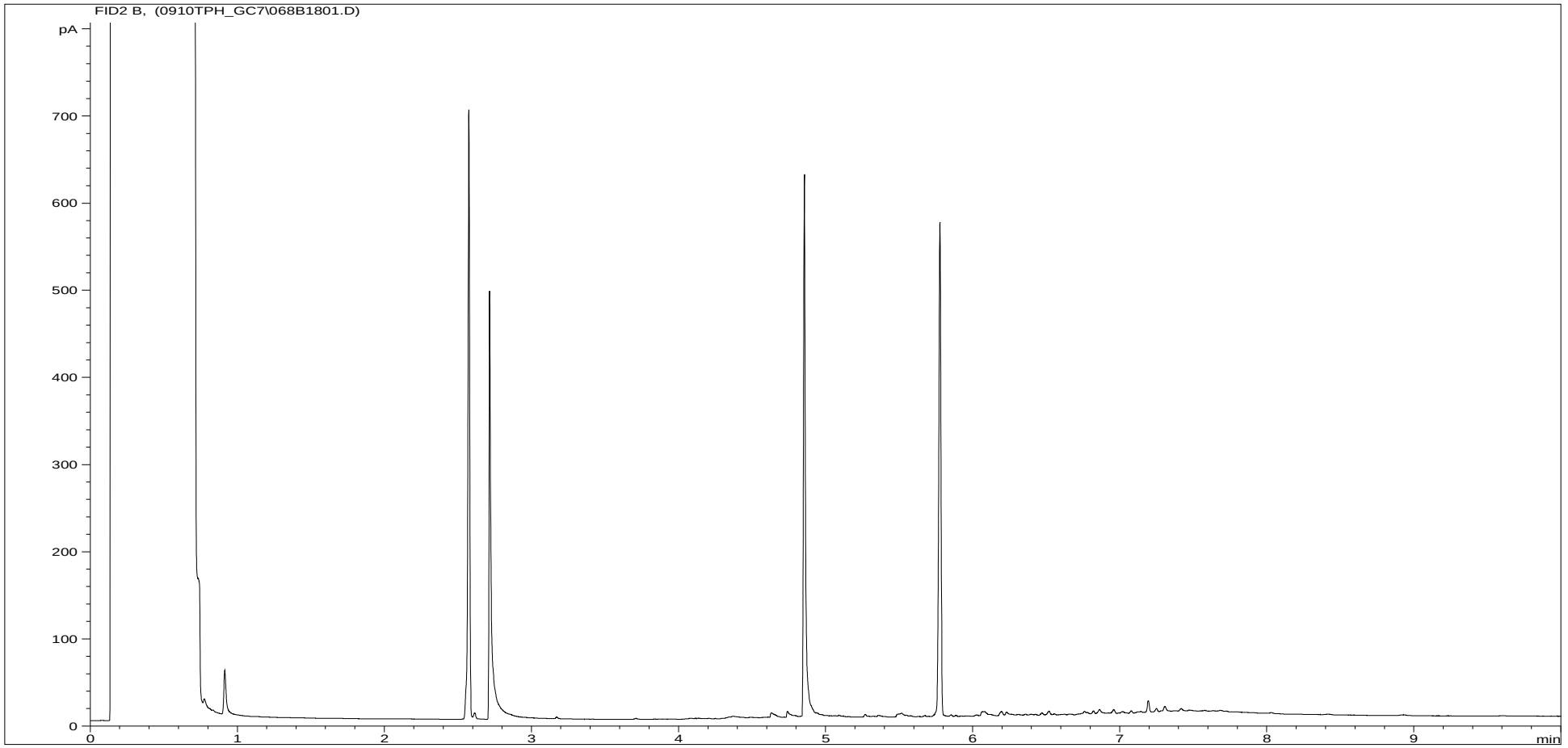


Sample ID:	CL0826251	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP12A ES 1 0.20
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\067B1701.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

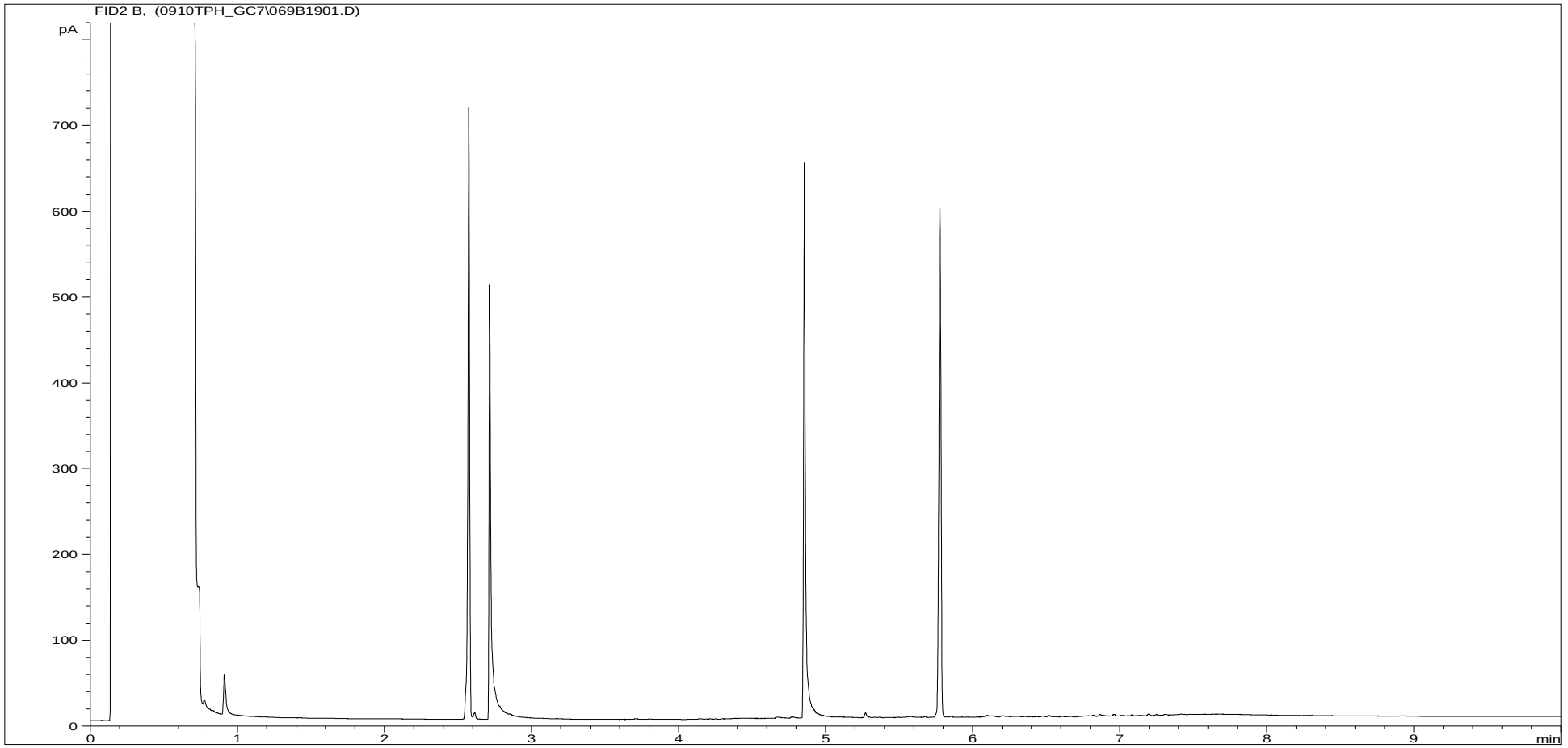


Sample ID:	CL0826252	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP14 ES 1 0.30
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\068B1801.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

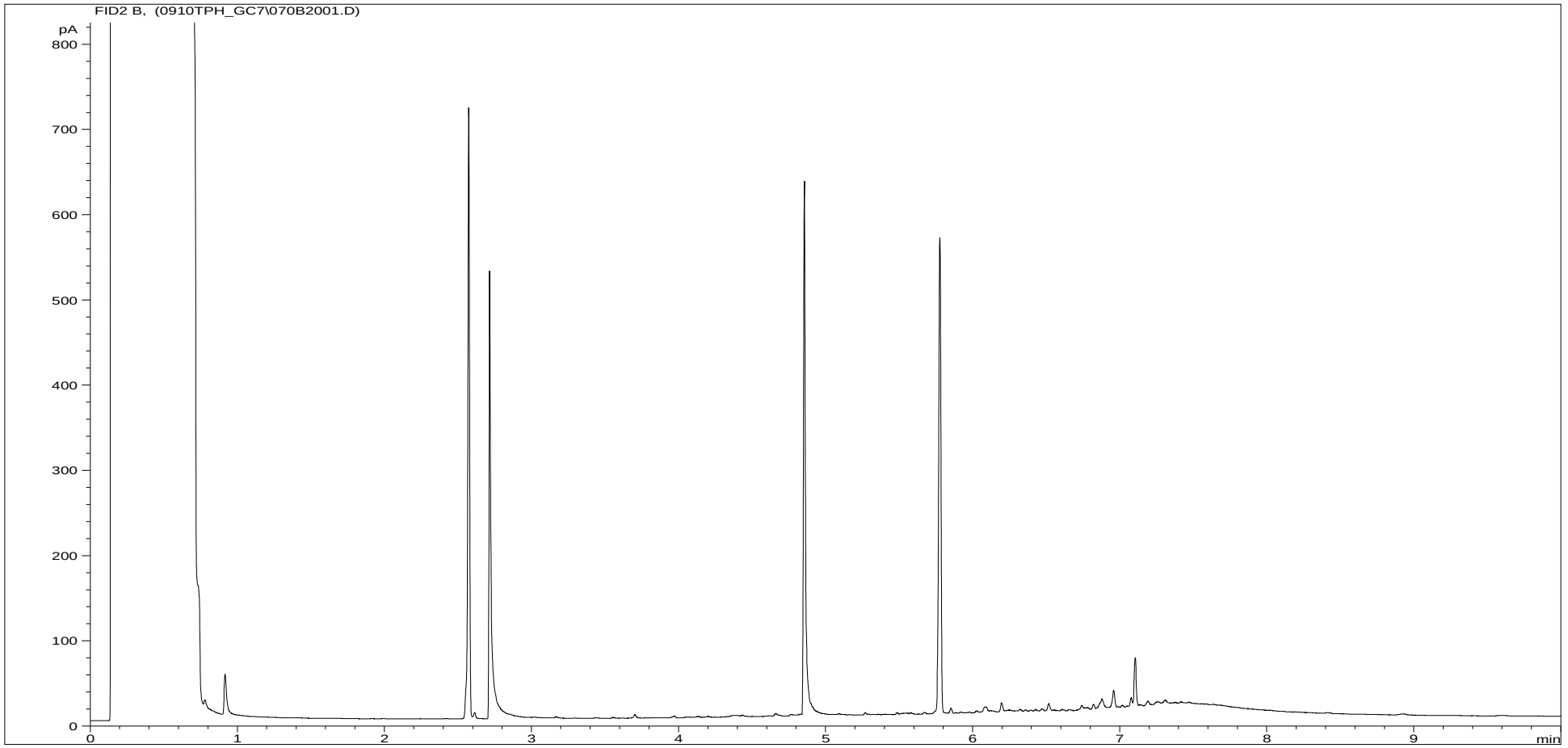


Sample ID:	CL0826253	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP15 ES 1 0.30
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\069B1901.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

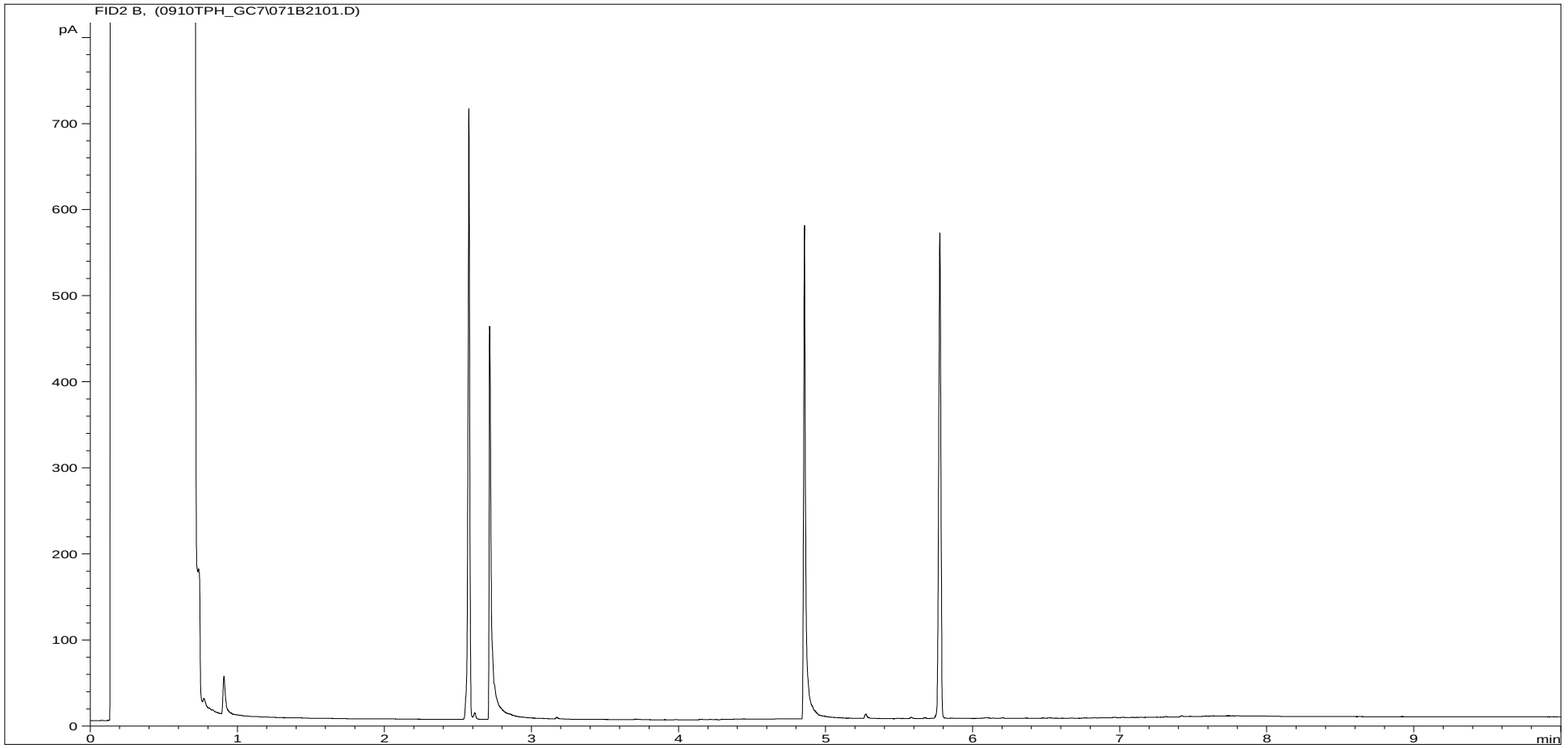


Sample ID:	CL0826254	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP15 ES 2 0.70
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\070B2001.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

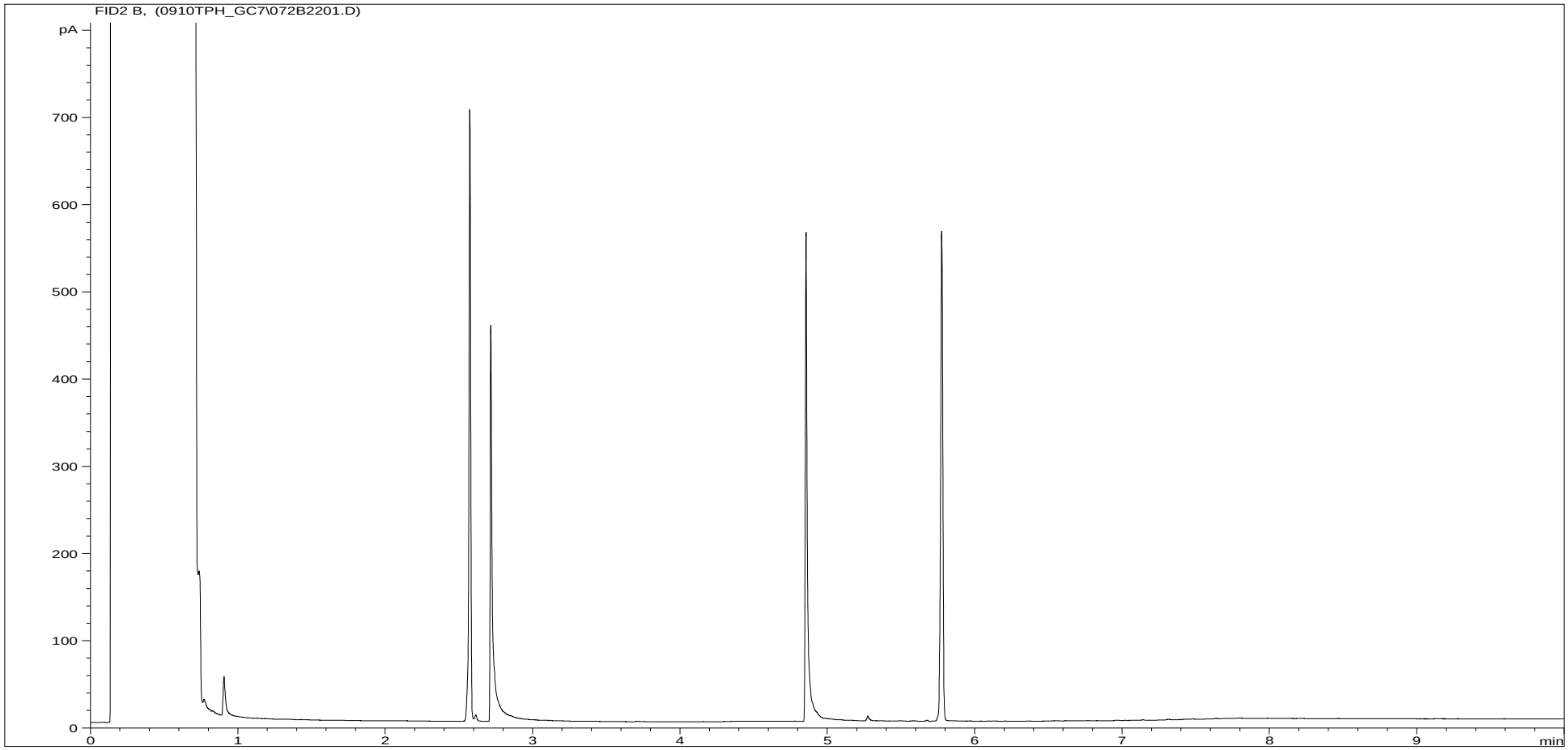


Sample ID:	CL0826255	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP16 ES 1 0.30 (NVM)
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\071B2101.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

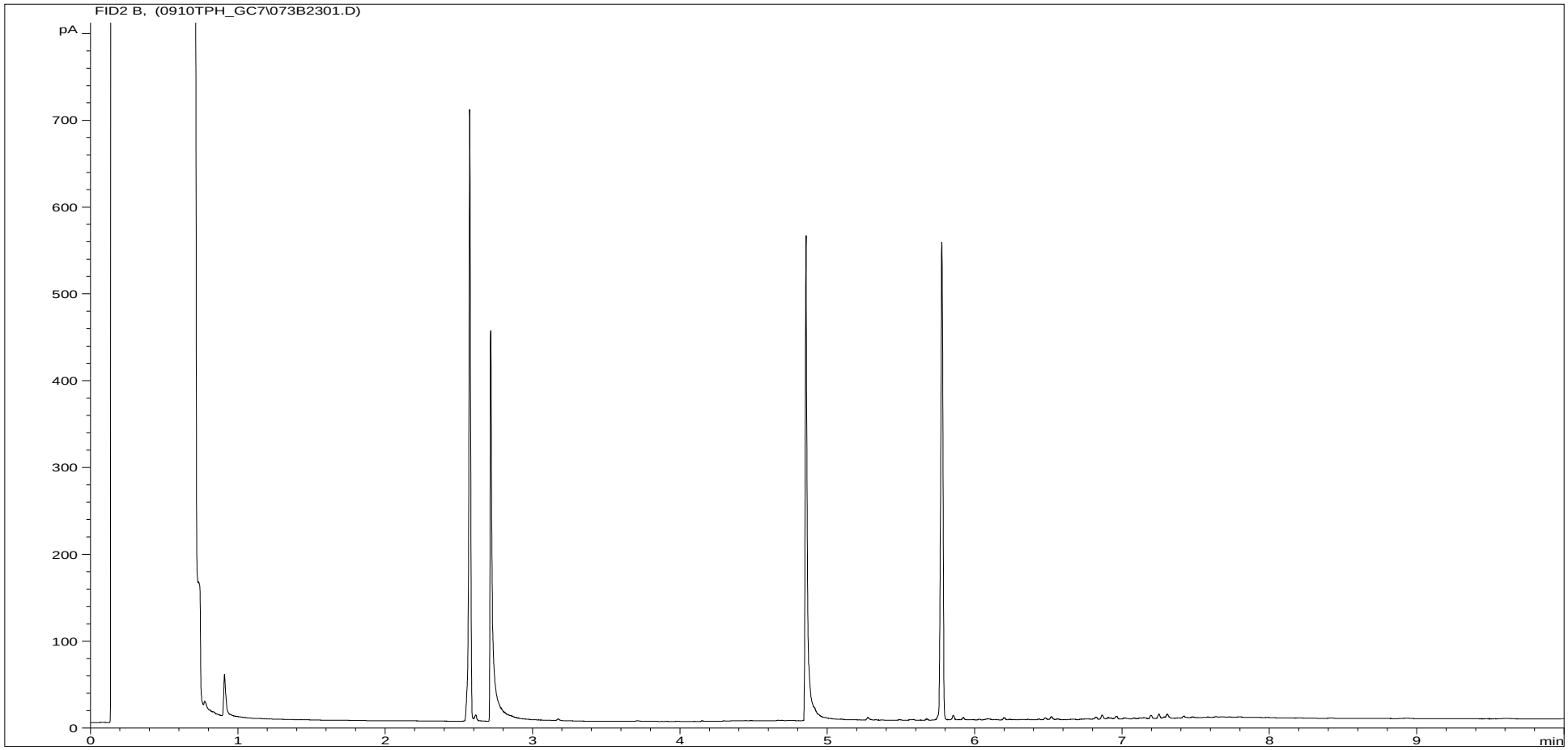


Sample ID:	CL0826256	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP16 ES 2 1.00
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\072B2201.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

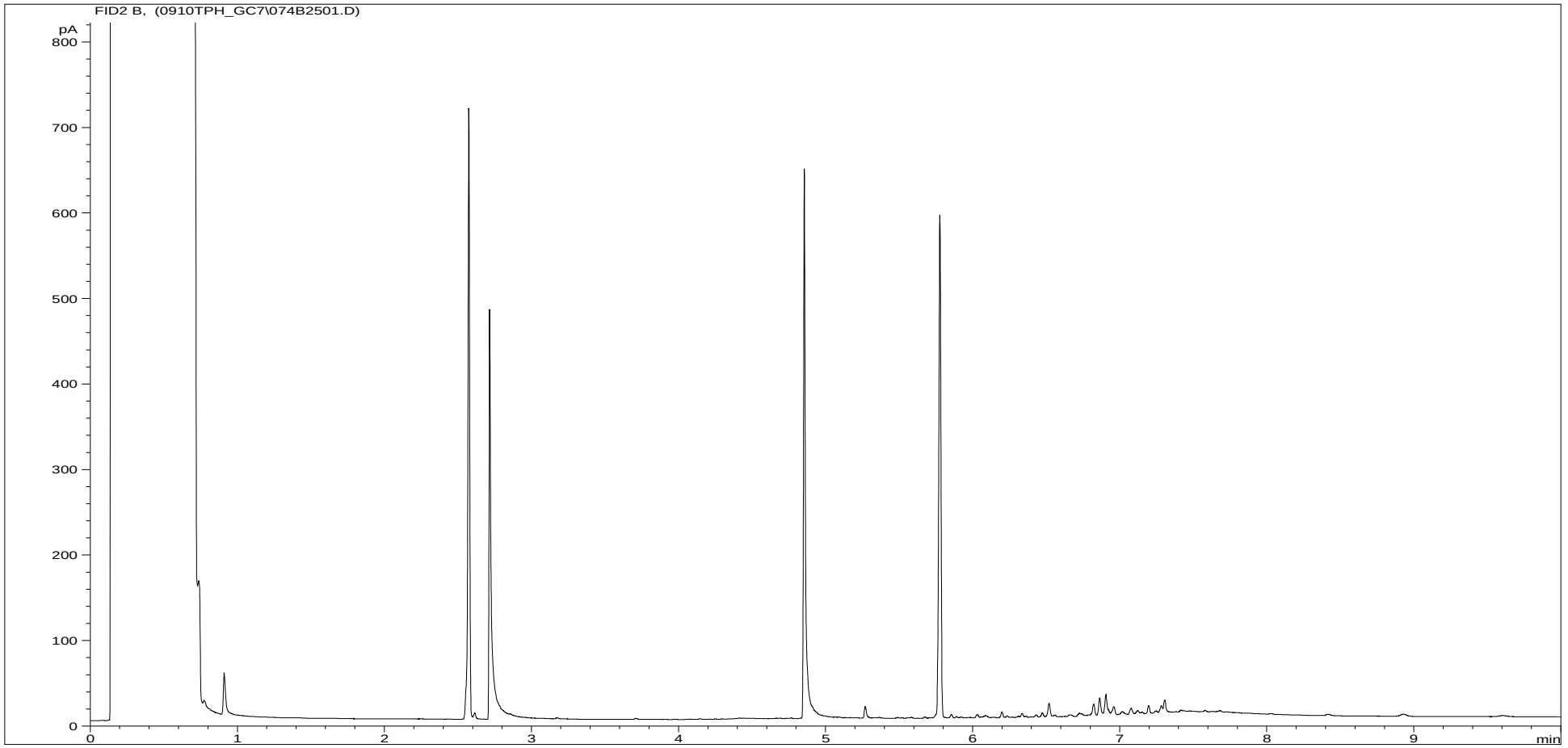


Sample ID:	CL0826257	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP17 ES 1 0.30
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\073B2301.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL0826258	**Job Number:**	S08_5713M
Multiplier:	8	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNFNORACE.M	**Client Sample Ref:**	TP17 ES 3 1.20
Acquisition Date/Time:	10-Sep-08		
Datafile:	D:\TES\DATA\Y2008\0910TPH_GC7\074B2501.D		

Where individual results are flagged see report notes for for status.

Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Report Notes

Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated
Water Soluble Sulphate on 2:1 water:soil extract
AR denotes analysis conducted on the As Received sample

Water analysis specific:
Results expressed as mg/l unless stated otherwise

Oil analysis specific:
Results expressed as mg/kg unless stated otherwise
S.G. expressed as g/cm^3@ 15^{o}C

Filter analysis specific:
Results expressed as mg on filter unless stated otherwise

VOC analysis specific:
Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:
Results expressed as ug/l unless stated otherwise

Air (Carbon tube) analysis specific:
Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibres Observed

General notes:
^ this analysis was subcontracted to another laboratory
$ Within laboratory tolerances
$$ unable to analyse due to nature of sample
¥ Results for guidance only, possible interference
& Blank corrected
I.S insufficient sample for analysis
Intf Unable to analyse due to interferences
N.D Not determined
N.R Not recorded
N.Det Not detected
Req Analysis Requested, see attached sheets for results
Þ Raised detection limit due to nature of sample
***** denotes that all accreditation has been removed by the laboratory for this result.
‡ denotes that Mcerts accreditation has been removed by the laboratory for this result.
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

END OF REPORT

TEST REPORT
WATER SAMPLE ANALYSIS

1252

TES Report No. EXR/088900 (Ver. 1)

Soil Mechanics
Unit 15
Crosby Yard
Wildmill
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Hirwaun Industrial Estate

The 5 samples described in this report were logged for analysis by TES Bretby on 14-Oct-2008.
The analysis was completed by: 30-Oct-2008

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

On behalf of
TES Bretby :
John Elstub

Project Co-ordinator

Date of Issue: 30-Oct-2008

Tests marked '^' have been subcontracted to another laboratory.

TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Units :			uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :		WSLM3	WSLM2	KONENS	ISEF	CPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	CPWATVAR	ICPMSW	ICPMSW	ICPMSW
Method Reporting Limits :			100	1	0.1	3.0	0.001	0.001	0.0001	0.001	0.001	0.002	0.001	0.01	0.0001	0.001	0.001	
UKAS Accredited :		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
TES ID Number EXT	**Client Sample Description**	**pH units**	**Conductivity uS/cm @ 25C**	**Chloride as Cl w**	**Fluoride as F**	**Total Sulphur as SO4 (Total) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**	**Selenium as Se (Dissolved)**	**Molybdenum as Mo (Dissolved)**	
0835481	BH101 W	6.6	670	27	0.3	21.0	0.015	0.005	0.0003	0.006	0.002	0.095	0.014	0.08	0.0001	0.004	0.004	
0835482	BH103 W	7.2	362	7	0.2	22.0	0.005	0.004	0.0002	0.004	0.003	0.066	0.002	0.03	<0.0001	0.001	0.001	
0835483	BH105 W	7.2	377	7	0.2	16.0	0.003	0.004	0.0001	0.003	0.003	0.067	0.003	0.04	<0.0001	0.001	0.001	
0835484	BH106 W	6.8	281	9	0.2	11.0	0.004	0.002	0.0002	0.002	0.001	0.037	<0.001	0.03	<0.0001	<0.001	<0.001	
0835485	BH109 W	7.5	651	25	4.2	32.0	0.002	0.003	<0.0001	<0.001	<0.001	0.019	0.003	0.04	<0.0001	<0.001	0.005	

TES Bretby

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Burton-on-Trent, Staffordshire, DE15 0XD

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Fax +44 (0) 1283 554422

Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Water Sample Analysis

Date Printed	30-Oct-08
Report Number	**EXR/088900**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.

Units :		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
Method Codes :		ICPMSW	KONENS	KONENS	ISESW24	WSLM11	WSLM13	ICPWATVAR	PAHSWSIM	SFAPI	SFAPI	SFAPI	WSLM20	SFAPI	TPHFID		
Method Reporting Limits :		0.001	0.01	0.01	0.2	5	0.1	0.01	0.01	0.1	0.02	0.02	2	0.05	0.01		
UKAS Accredited :		yes	yes	yes	yes	yes	yes	no	no	no	no	no	no	no	no		
TES ID Number EX/	**Client Sample Description**	**Antimony as Sb (Dissolved)**	**Ammoniacal Nitrogen as N**	**Chromium VI as Cr**	**Sulphide (Free) as S**	**Chemical Oxygen Demand**	**Total Organic Carbon**	**Barium as Ba (Dissolved) a**	**PAH MS-SIM (16)**	**Thiocyanate as SCN**	**Cyanide (Free) as CN**	**Cyanide (Total) as CN**	**Biochemical Oxygen Demand**	**Phenol Index as C6H5OH**	**TPH GC (0.01)**		
0835481	BH101 W	<0.001	11.5	<0.01	0.5	80	24	0.30	Req	<0.20	<0.02	<0.02	13	<0.05	0.04		
0835482	BH103 W	<0.001	1.0	<0.01	<0.2	17	4.2	0.28	Req	<0.20	<0.02	<0.02	<2.0	<0.05	0.02		
0835483	BH105 W	<0.001	0.5	<0.01	<0.2	34	4.7	0.26	Req	<0.20	<0.02	<0.02	<2.0	<0.05	0.03		
0835484	BH106 W	<0.001	0.19	<0.01	<0.2	10	4.0	0.18	Req	<0.20	<0.02	<0.02	2.5	<0.05	<0.01		
0835485	BH109 W	<0.001	0.5	<0.01	1.5	25	8.7	0.18	Req	<0.20	<0.02	<0.02	<2.0	<0.05	0.14		

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Client Name **Soil Mechanics**

Contact Mr H Woodroffe

Hirwaun Industrial Estate

Water Sample Analysis

Date Printed	30-Oct-08
Report Number	**EXR/088900**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.

Units :		ug/l	ug/l	ug/l	ug/l												
Method Codes :		BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA												
Method Reporting Limits :		5	5	5	10												
UKAS Accredited :		no	no	no	no												
TES ID Number EXR	**Client Sample Description**	**Benzene**	**Toluene**	**Ethyl Benzene**	**Xylenes**												
0835481	BH101 W	<5	<5	<5	<10												
0835482	BH103 W	<5	<5	<5	<10												
0835483	BH105 W	<5	<5	<5	<10												
0835484	BH106 W	<5	<5	<5	<10												
0835485	BH109 W	9	<5	<5	<10												

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Contact Mr H Woodroffe

Hirwaun Industrial Estate

Water Sample Analysis

Date Printed	30-Oct-08
Report Number	**EXR/088900**
Table Number	**1**

TES Bretby

Where individual results are flagged see report notes for for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Soil Mechanics: Hirwaun Industrial Estate		
Sample Details:	BH101 W	**Job Number:**	W08_8900
LIMS ID Number:	EX0835481	**Date Booked in:**	14-Oct-08
QC Batch Number:	923	**Date Extracted:**	23-Oct-08
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Oct-08
Directory:	023PAH_MS14\	**Matrix:**	Water
Dilution:	2.5	**Ext Method:**	Sep. Funnel

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.48	0.065	82
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.66	0.012	51
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.90	0.035	86
Anthracene	120-12-7	5.95	0.010	84
Fluoranthene	206-44-0	7.27	0.071	99
Pyrene	129-00-0	7.55	0.061	99
Benzo[a]anthracene	56-55-3	9.23	0.032	97
Chrysene	218-01-9	9.29	0.032	97
Benzo[b]fluoranthene	205-99-2	10.78	0.020	M
Benzo[k]fluoranthene	207-08-9	10.80	0.024	M
Benzo[a]pyrene	50-32-8	11.20	0.021	86
Indeno[1,2,3-cd]pyrene	193-39-5	12.59	0.010	98
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.433	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	76
Acenaphthene-d10	72
Phenanthrene-d10	69
Chrysene-d12	69
Perylene-d12	69

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	57
Terphenyl-d14	98

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer an	Soil Mechanics: Hirwaun Industrial Estate		
Sample Deta	BH103 W	**Job Number:**	W08_8900
LIMS ID Num	EX0835482	**Date Booked in:**	14-Oct-08
QC Batch Nu	923	**Date Extracted:**	23-Oct-08
Quantitation	Initial Calibration	**Date Analysed:**	24-Oct-08
Directory:	023PAH_MS14\	**Matrix:**	Water
Dilution:	2.5	**Ext Method:**	Sep. Funnel

UKAS accredited?: No

Target Compou	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.48	0.010	95
Acenaphthyle	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.90	0.017	95
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	7.27	0.021	96
Pyrene	129-00-0	7.55	0.018	97
Benzo[a]anthr	56-55-3	-	< 0.010	-
Chrysene	218-01-9	9.29	0.011	98
Benzo[b]fluora	205-99-2	-	< 0.010	-
Benzo[k]fluora	207-08-9	-	< 0.010	-
Benzo[a]pyren	50-32-8	-	< 0.010	-
Indeno[1,2,3-c	193-39-5	-	< 0.010	-
Dibenzo[a,h]a	53-70-3	-	< 0.010	-
Benzo[g,h,i]pe	191-24-2	-	< 0.010	-
Total (USEPA	-	-	< 0.187	-

"M" denotes that % fit has been manually interpreted

Internal Stan	% Area
1,4-Dichlorobe	NA
Naphthalene-d	70
Acenaphthene	65
Phenanthrene	62
Chrysene-d12	62
Perylene-d12	61

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	68
Terphenyl-d14	109

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Soil Mechanics: Hirwaun Industrial Estate		
Sample Details:	BH105 W	**Job Number:**	W08_8900
LIMS ID Number:	EX0835483	**Date Booked in:**	14-Oct-08
QC Batch Number:	923	**Date Extracted:**	23-Oct-08
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Oct-08
Directory:	023PAH_MS14\	**Matrix:**	Water
Dilution:	2.5	**Ext Method:**	Sep. Funnel

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.48	0.012	96
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.91	0.011	97
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.163	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	82
Acenaphthene-d10	79
Phenanthrene-d10	76
Chrysene-d12	75
Perylene-d12	72

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	63
Terphenyl-d14	104

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Soil Mechanics: Hirwaun Industrial Estate		
Sample Details:	BH106 W	**Job Number:**	W08_8900
LIMS ID Number:	EX0835484	**Date Booked in:**	14-Oct-08
QC Batch Number:	923	**Date Extracted:**	23-Oct-08
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Oct-08
Directory:	023PAH_MS14\	**Matrix:**	Water
Dilution:	2.5	**Ext Method:**	Sep. Funnel

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.010	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.160	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	84
Acenaphthene-d10	84
Phenanthrene-d10	83
Chrysene-d12	83
Perylene-d12	79

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	48
Terphenyl-d14	86

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Soil Mechanics: Hirwaun Industrial Estate		
Sample Details:	BH109 W	**Job Number:**	W08_8900
LIMS ID Number:	EX0835485	**Date Booked in:**	14-Oct-08
QC Batch Number:	923	**Date Extracted:**	23-Oct-08
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Oct-08
Directory:	023PAH_MS14\	**Matrix:**	Water
Dilution:	2.5	**Ext Method:**	Sep. Funnel

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.48	1.219	98
Acenaphthylene	208-96-8	4.54	0.021	74
Acenaphthene	83-32-9	4.66	0.755	98
Fluorene	86-73-7	5.05	0.478	95
Phenanthrene	85-01-8	5.90	0.104	82
Anthracene	120-12-7	5.95	0.365	M
Fluoranthene	206-44-0	7.26	0.327	100
Pyrene	129-00-0	7.55	0.204	95
Benzo[a]anthracene	56-55-3	9.23	0.026	85
Chrysene	218-01-9	9.29	0.027	90
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 3.586	-

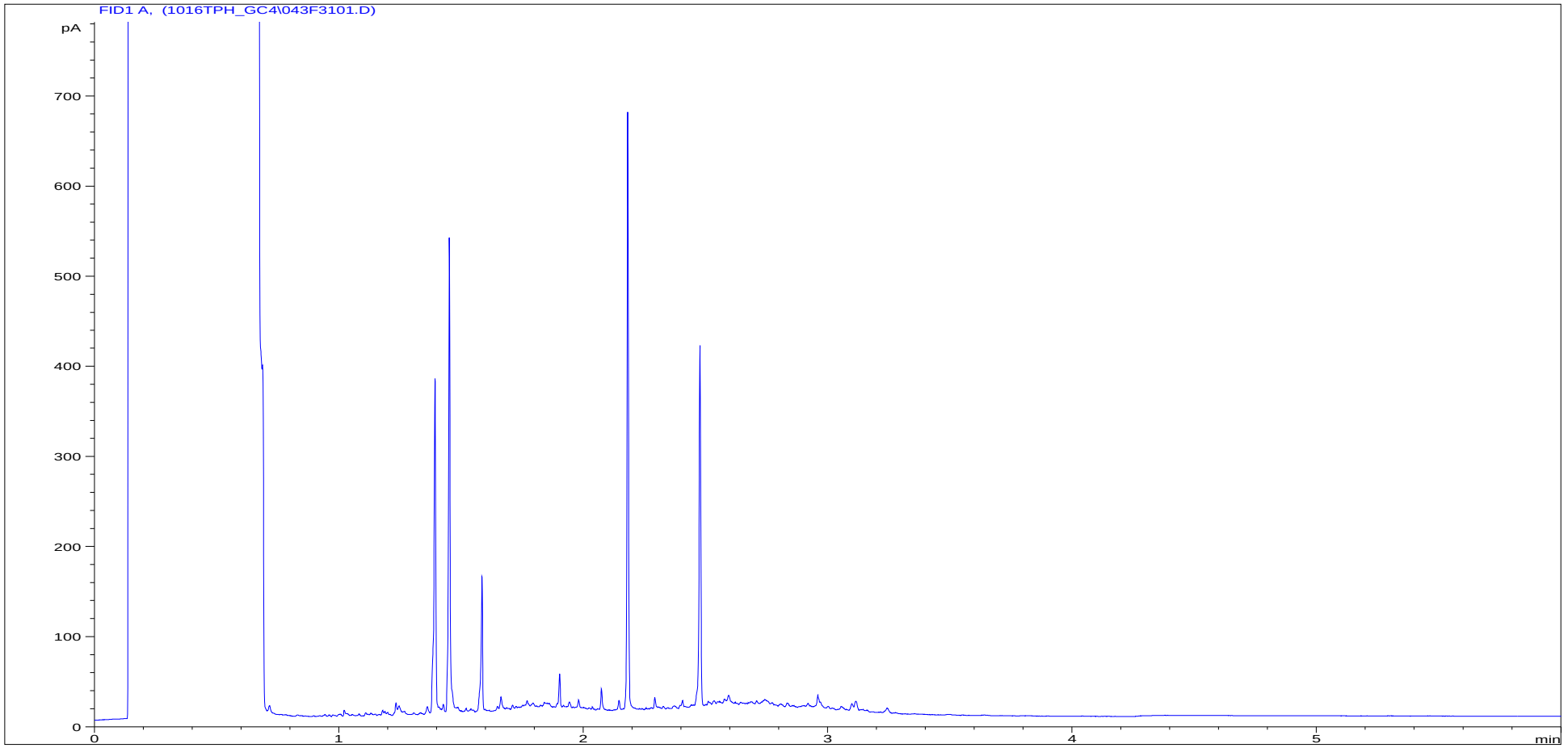
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	74
Acenaphthene-d10	70
Phenanthrene-d10	68
Chrysene-d12	66
Perylene-d12	62

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	77
Terphenyl-d14	104

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

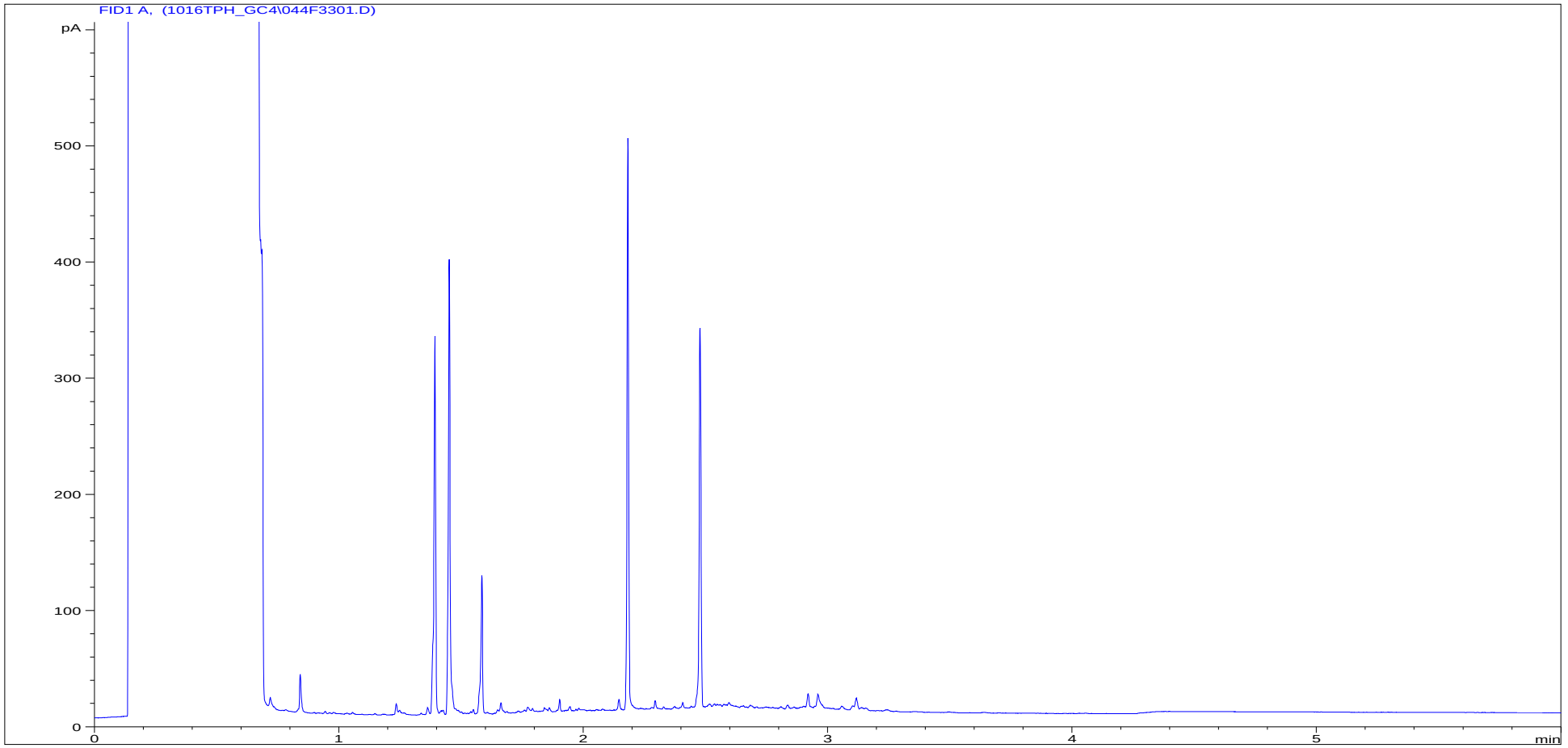
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX0835481	**Job Number:**	W08_8900
Multiplier:	0.005	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH101 W
Acquisition Date/Time:	16-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1016TPH_GC4\043F3101.D		

Where individual results are flagged see report notes for for status.

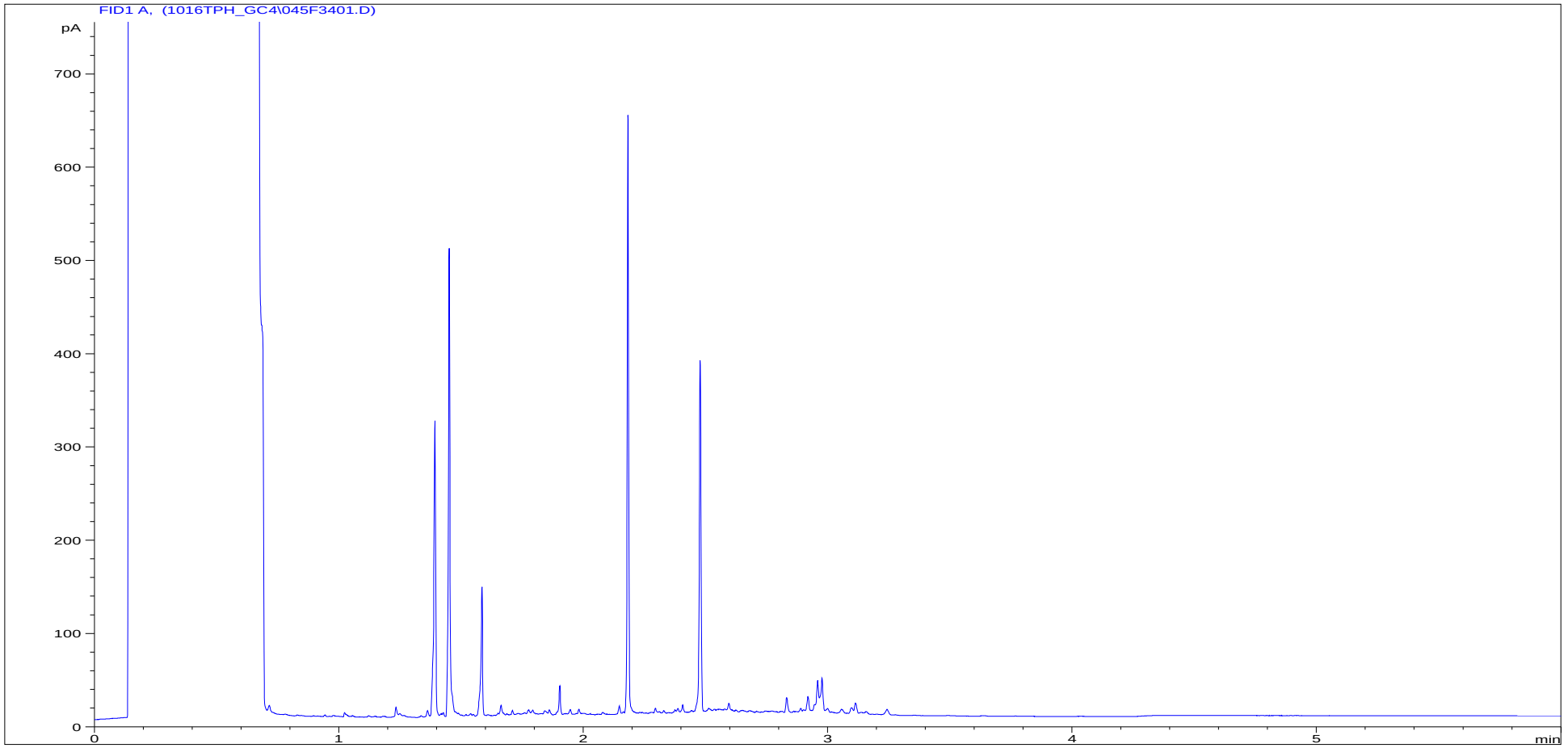
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX0835482	**Job Number:**	W08_8900
Multiplier:	0.005	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH103 W
Acquisition Date/Time:	16-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1016TPH_GC4\044F3301.D		

Where individual results are flagged see report notes for for status.

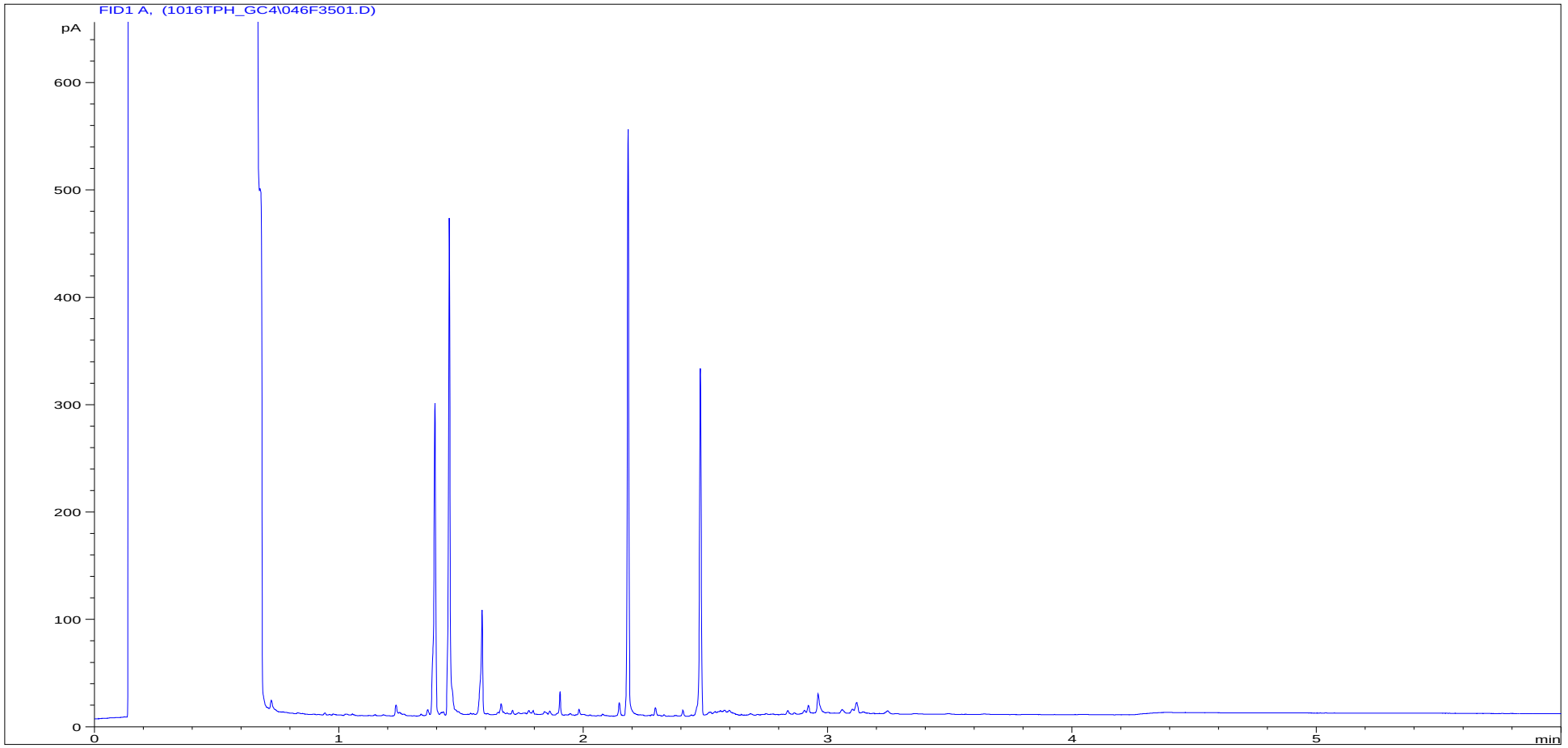
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX0835483	**Job Number:**	W08_8900
Multiplier:	0.005	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH105 W
Acquisition Date/Time:	16-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1016TPH_GC4\045F3401.D		

Where individual results are flagged see report notes for for status.

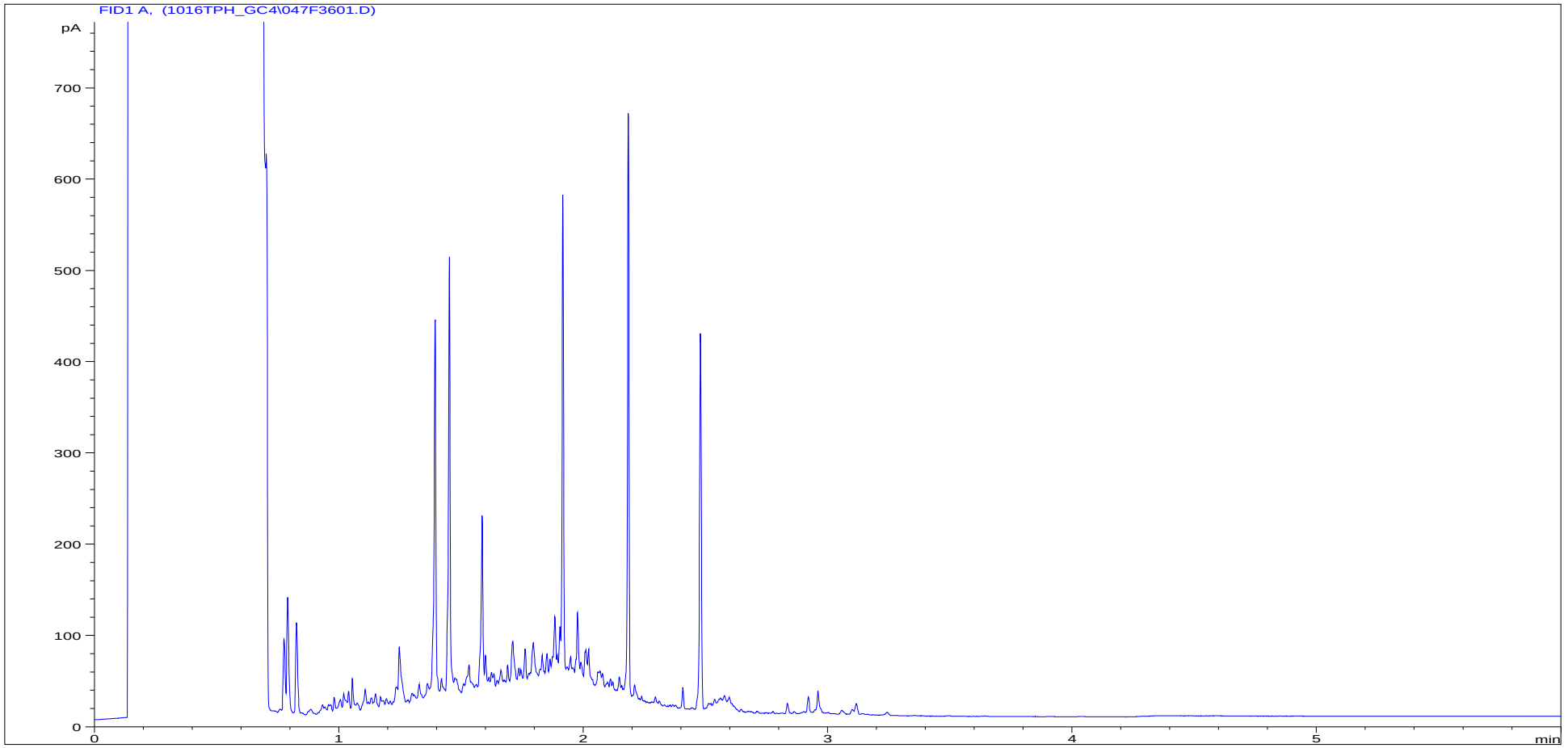
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX0835484	**Job Number:**	W08_8900
Multiplier:	0.005	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH106 W
Acquisition Date/Time:	16-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1016TPH_GC4\046F3501.D		

Where individual results are flagged see report notes for for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX0835485	**Job Number:**	W08_8900
Multiplier:	0.005	**Client:**	Soil Mechanics
Dilution:	1	**Site:**	Hirwaun Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH109 W
Acquisition Date/Time:	16-Oct-08		
Datafile:	D:\TES\DATA\Y2008\1016TPH_GC4\047F3601.D		

Where individual results are flagged see report notes for for status.

Report Notes

Soil/Solid analysis specific:
Results expressed as mg/kg on an air dried basis unless stated otherwise
S04 analysis not conducted in accordance with BS1377 unless otherwise stated
Water Soluble Sulphate on 2:1 water:soil extract
AR denotes analysis conducted on the As Received sample

Water analysis specific:
Results expressed as mg/l unless stated otherwise

Oil analysis specific:
Results expressed as mg/kg unless stated otherwise
S.G. expressed as g/cm^3@ 15^oC

Filter analysis specific:
Results expressed as mg on filter unless stated otherwise

VOC analysis specific:
Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:
Results expressed as ug/l unless stated otherwise

Air (Carbon tube) analysis specific:
Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:
CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibres Observed

General notes:
^ this analysis was subcontracted to another laboratory
$ Within laboratory tolerances
$$ unable to analyse due to nature of sample
¥ Results for guidance only, possible interference
& Blank corrected
I.S insufficient sample for analysis
Intf Unable to analyse due to interferences
N.D Not determined
N.R Not recorded
N.Det Not detected
Req Analysis Requested, see attached sheets for results
Þ Raised detection limit due to nature of sample
***** denotes that all accreditation has been removed by the laboratory for this result.
‡ denotes that Mcerts accreditation has been removed by the laboratory for this result.
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

END OF REPORT

ENCLOSURE E
PHOTOGRAPHS

Borehole Core Photographs

Soil Mechanics

Notes	Project	Hirwaun Industrial Estate	Plate
	Project No	H8076	E1
	Carried out for	Enviroparks Ltd	

Borehole Core Photographs

Soil Mechanics

Notes	Project	Hirwaun Industrial Estate	Plate
	Project No	H8076	E2
	Carried out for	Enviroparks Ltd	

Borehole Core Photographs

Soil Mechanics

Notes	Project	Hirwaun Industrial Estate	Plate
	Project No	H8076	E3
	Carried out for	Enviroparks Ltd	

Borehole Core Photographs

Soil Mechanics

Notes	Project	Hirwaun Industrial Estate	Plate
	Project No	H8076	E4
	Carried out for	Enviroparks Ltd	

Borehole Core Photographs

Soil Mechanics

Notes	Project	Hirwaun Industrial Estate	Plate
	Project No	H8076	E5
	Carried out for	Enviroparks Ltd	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Industrial Estate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E6

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E7**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E8**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E9**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E10

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E11

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E12**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E13**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:

Project	Hirwaun Indusrial Eastate
Project No.	H8076
Carried out for	Pell Frischmann

Figure
E14

Trial Pit Photographs

Soil Mechanics

Notes:

Project	Hirwaun Indusrial Eastate
Project No.	H8076
Carried out for	Pell Frischmann

Figure
E15

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E16**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E17**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E18**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E19**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E20

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E21

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E22**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E23**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Industrial Estate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E6

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E7**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E8**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E9**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E10

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E11

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E12**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E13**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:

Project	Hirwaun Indusrial Eastate
Project No.	H8076
Carried out for	Pell Frischmann

Figure
E14

Trial Pit Photographs

Soil Mechanics

Notes:

Project	Hirwaun Indusrial Eastate
Project No.	H8076
Carried out for	Pell Frischmann

Figure
E15

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E16**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E18

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E19**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E20

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project	Hirwaun Indusrial Eastate
	Project No.	H8076
	Carried out for	Pell Frischmann

Figure
E21

Trial Pit Photographs

Soil Mechanics

Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E22**
	Carried out for Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

Notes:			Figure
	Project	Hirwaun Indusrial Eastate	**E17**
	Project No.	H8076	
	Carried out for	Pell Frischmann	

Trial Pit Photographs

Soil Mechanics

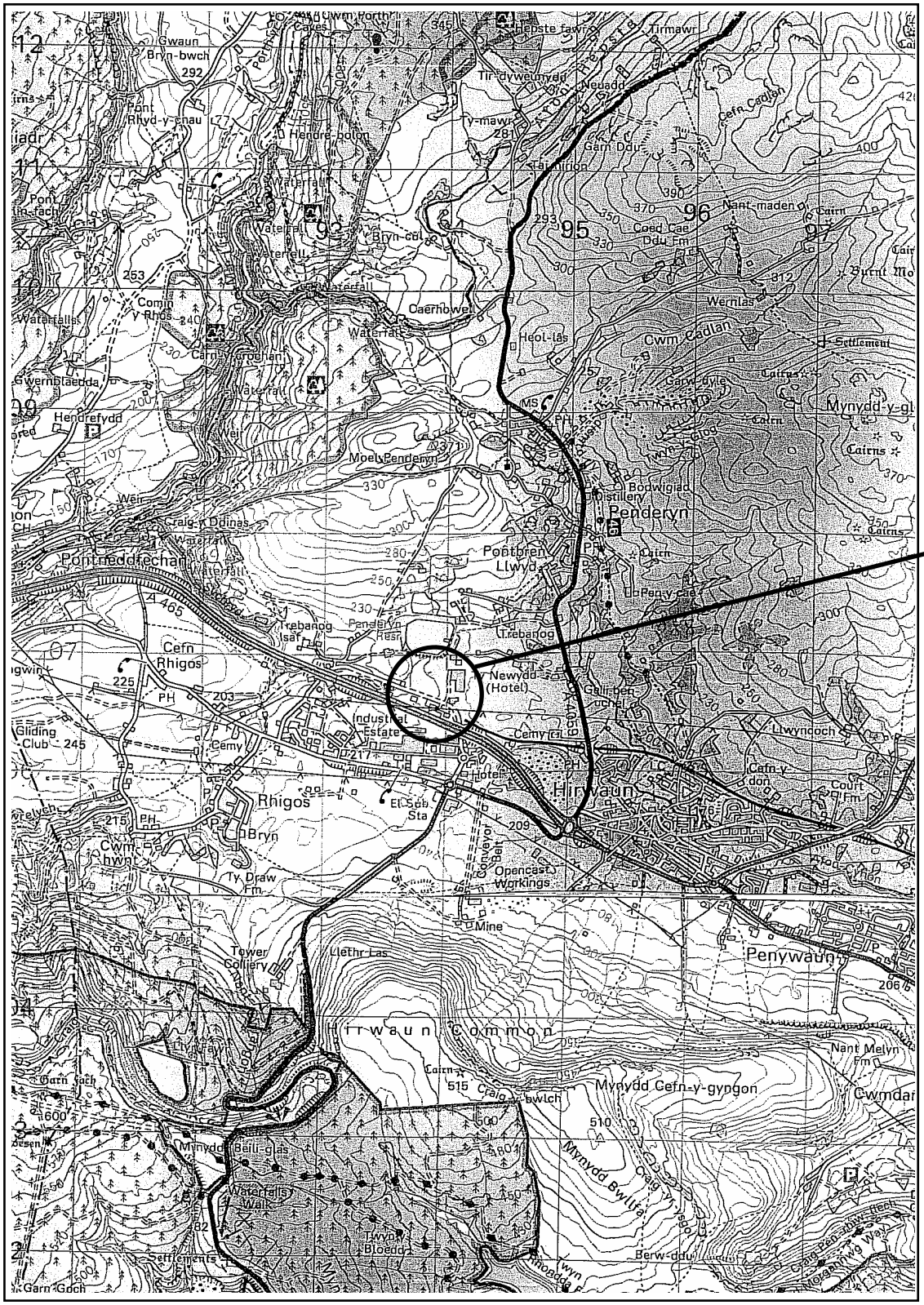
Notes:		
	Project Hirwaun Indusrial Eastate	**Figure**
	Project No. H8076	**E23**
	Carried out for Pell Frischmann	

ENCLOSURE F

DRAWINGS

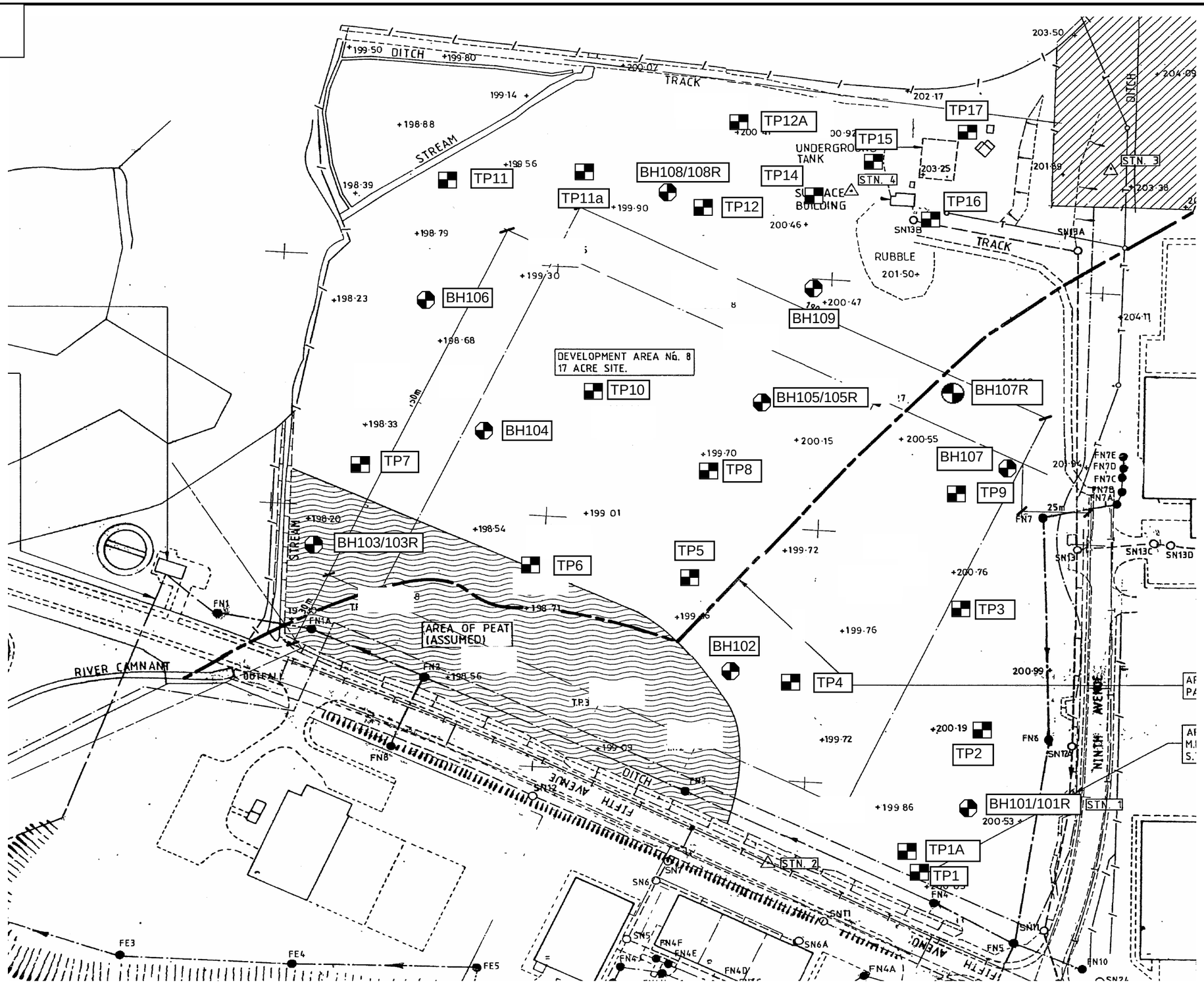
Site Location Plan

Soil Mechanics



Reproduced from the 2002 Ordnance Survey 1:50 000 scale Landranger map No 160 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, Environmental Services Group Limited. All rights reserved. Licence Number 100006060

Notes: Scale 1:50 000	**Project** Hirwaun Industrial Estate **Project No.** H8076 **Carried out for** Enviroparks Ltd	**Figure** **F1** Sheet 1 of 1



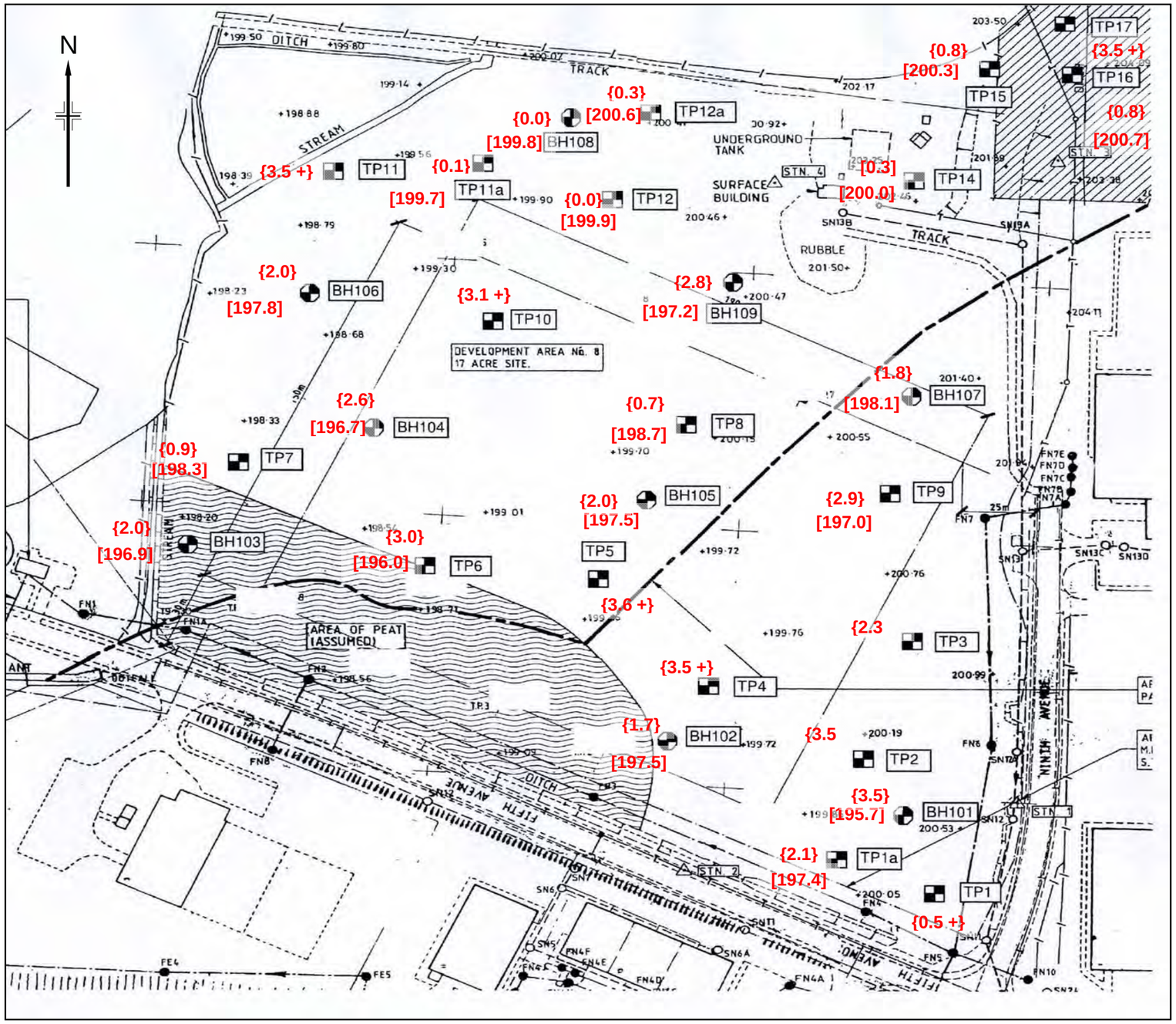
F 2 - EXPLORATORY HOLE LOCATION PLAN Not To Scale

Hirwaun Industrial Estate **H8076**

Soil Mechanics

Made Ground Depths & Basal Reduced levels

Soil Mechanics



Key:

{3.5}	Made Ground Thickness (m)
[195.7]	Made Ground base (m OD)

Notes:

Basal reduced level of Made Ground only shown where base proved.

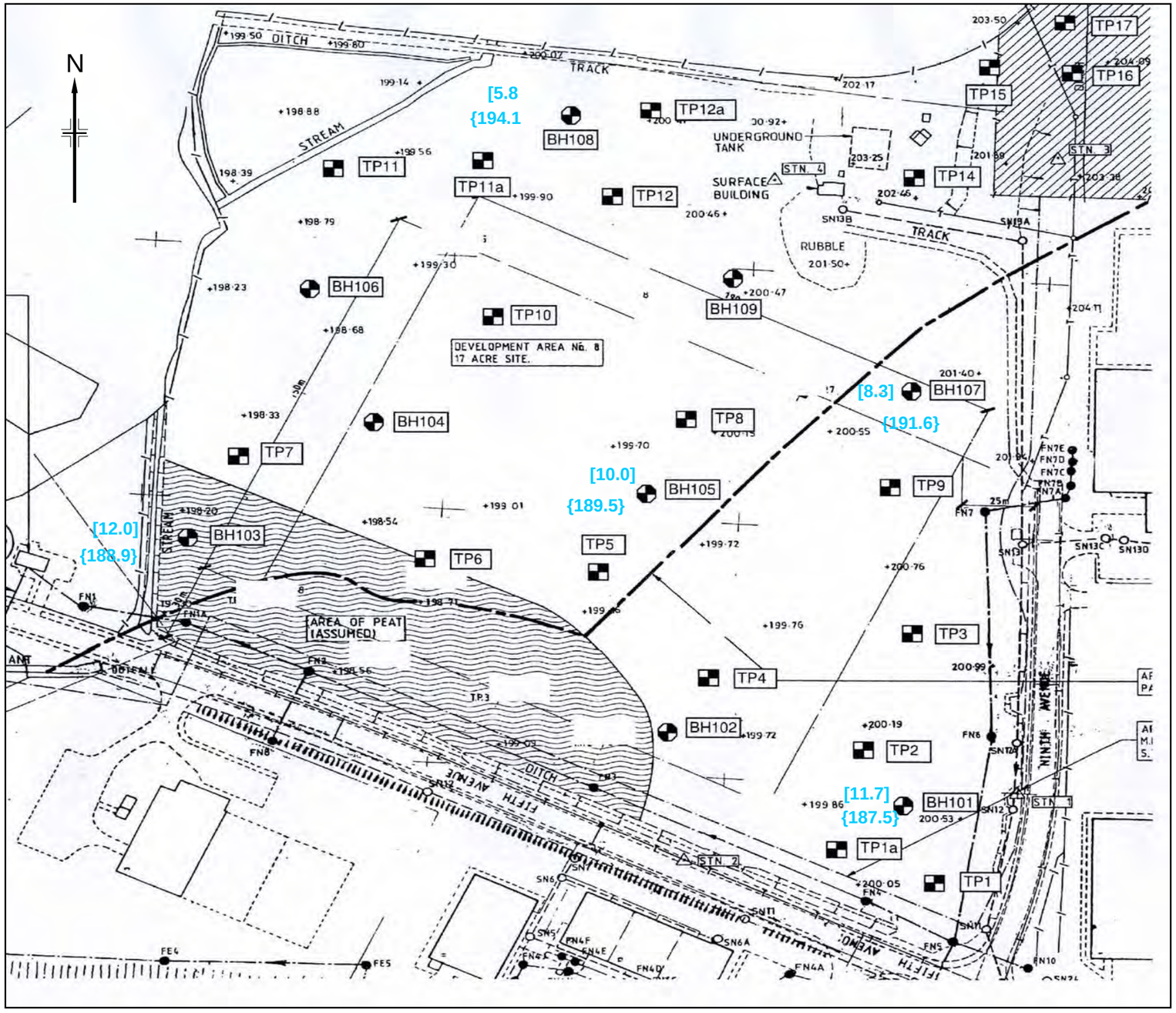
A '+' sign indicates basal depth of Made Ground not proved

Not to scale

Notes Not to scale	**Project** Project No Carried out for	Hirwaun Industrial Estate H8076 Enviroparks Limited	**Drawing** 3 Sheet 1 of 1

Rock Head Depths and Reduced Levels

Soil Mechanics



Key:

[10.0]	Rock head depth (m)
{186.9}	Rock head level (m OD)

Notes:

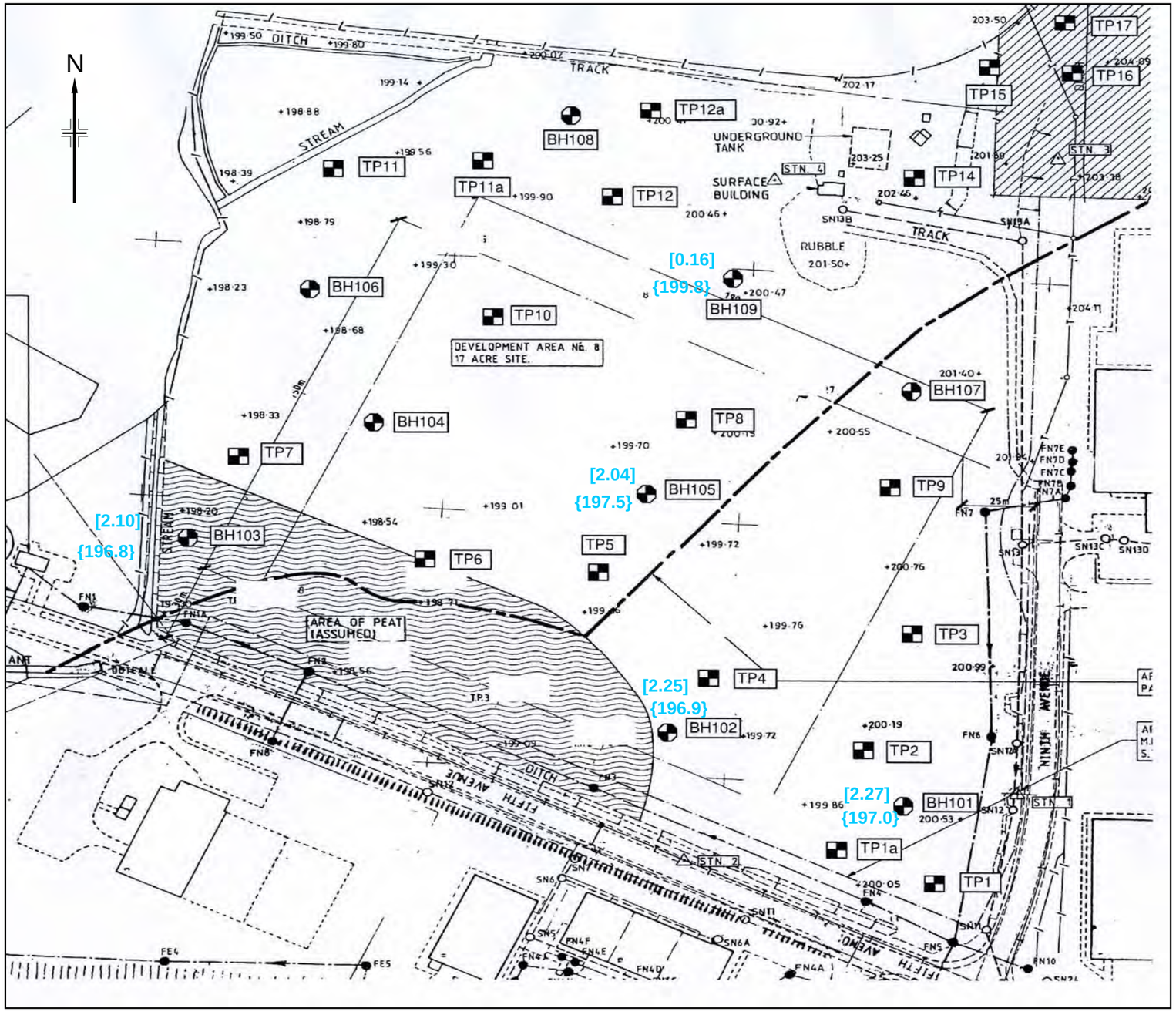
Only holes included above where rock was proved by coring

Not to scale

Notes Not to scale	**Project**	Hirwaun Industrial Estate	**Drawing** **4**
	Project No	H8076	
	Carried out for	Enviroparks Limited	Sheet 1 of 1

Groundwater Depths and Reduced Levels

Soil Mechanics



Key:

[2.01]	Depth to Groundwater (m)
{186.9}	Top of groundwater table reduced levels (m OD)

Notes:

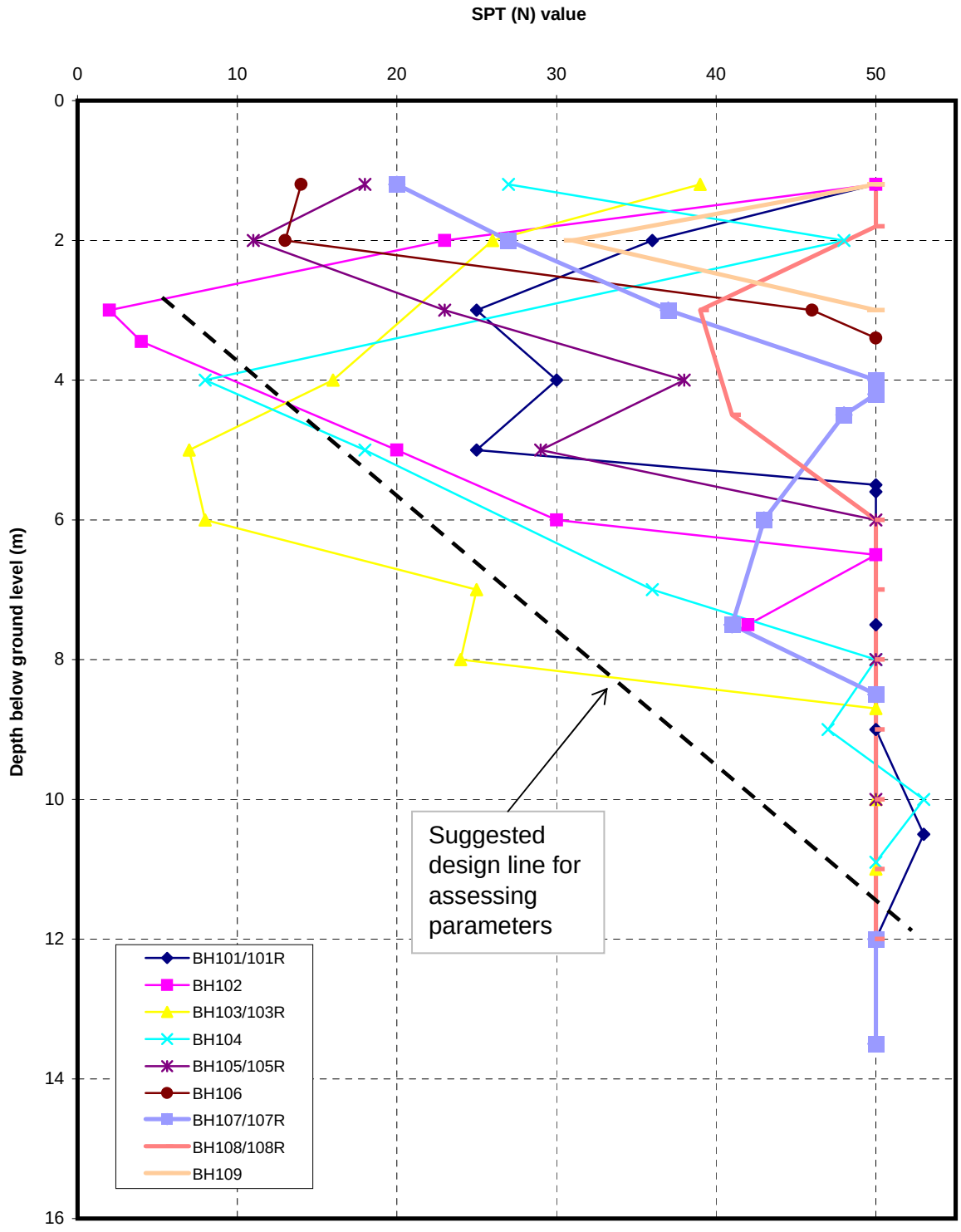
Only holes included where standpipe readings were taken

Not to scale

Notes Not to scale	**Project**	Hirwaun Industrial Estate	**Drawing** **5**
	Project No	H8076	
	Carried out for	Enviroparks Limited	Sheet 1 of 1

Plot of SPT 'N' Value Against Depth

Soil Mechanics



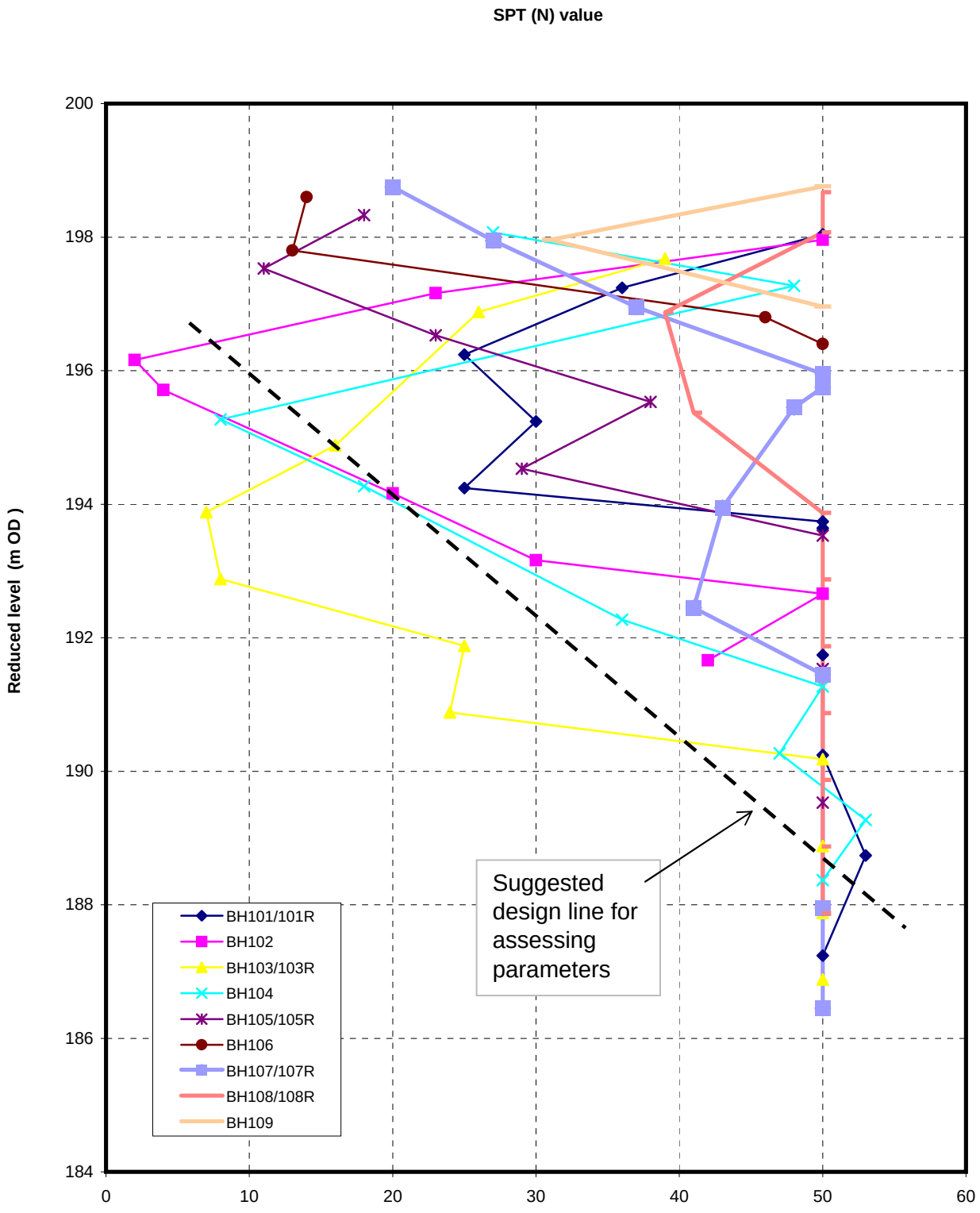
Notes:
In general 'N' values shown as 50 are maximum blow counts not 'N' values. True 'N' value greater than that shown but the high values are almost certainly a consequence of encountering cobbles/ boulders or bedrock and may not representative of the true relative density

Not to scale

Notes Not to scale	**Project** Hirwaun Industrial Estate Project No H8076 Carried out for Enviroparks Limited	**Drawing** 6 Sheet 1 of 1

Plot of SPT 'N' Value Against Reduced Level

Soil Mechanics



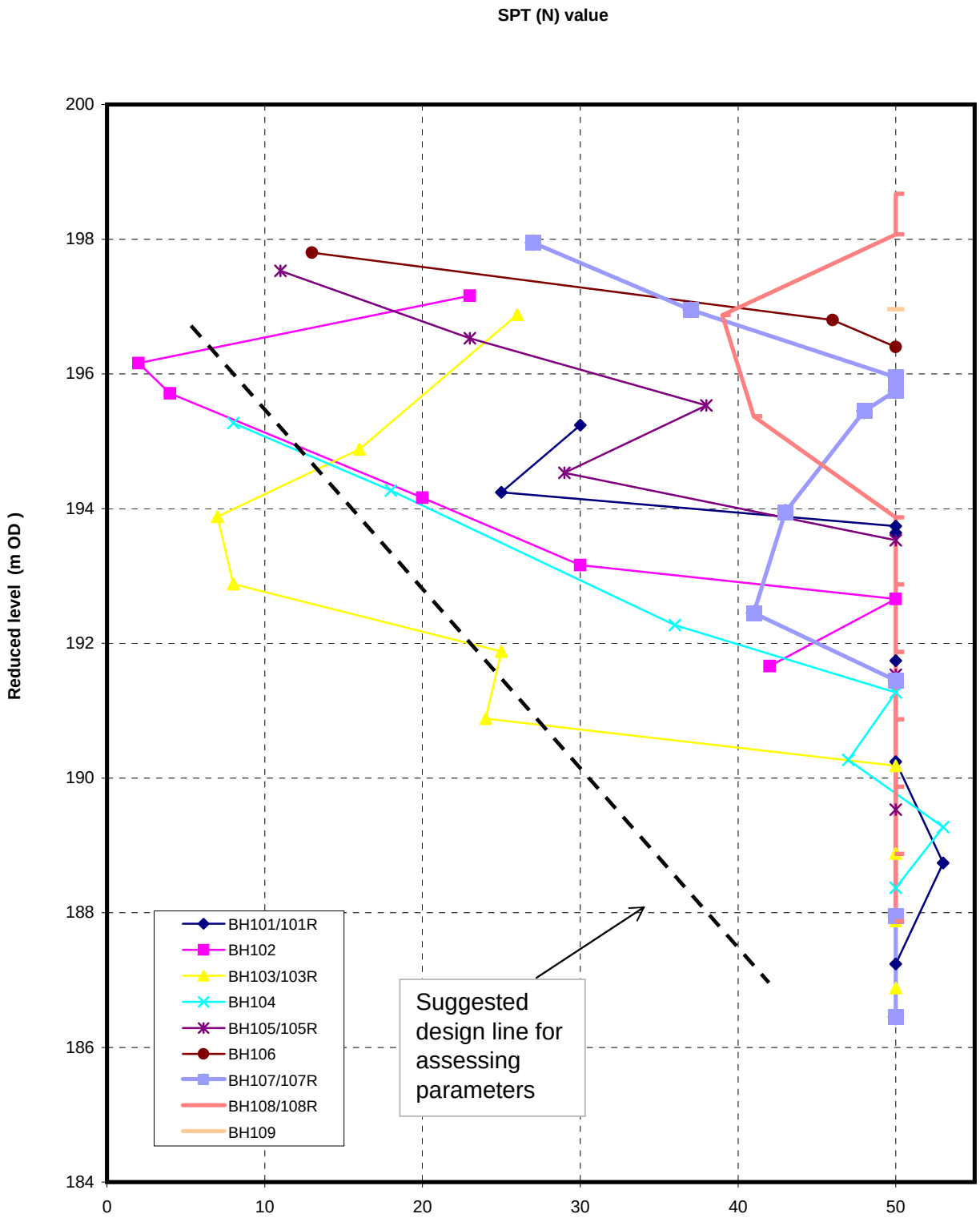
Notes:
In general 'N' values shown as 50 are maximum blow counts not 'N' values. True 'N' value greater than that shown but the high values are almost certainly a consequence of encountering cobbles/ boulders or bedrock and may not representative of the true relative density

Not to scale

Notes Not to scale	**Project** Project No Carried out for	Hirwaun Industrial Estate H8076 Enviroparks Limited	**Drawing** 7 Sheet 1 of 1

Plot of SPT 'N' Value Against Reduced Level - Glacial Deposits

Soil Mechanics



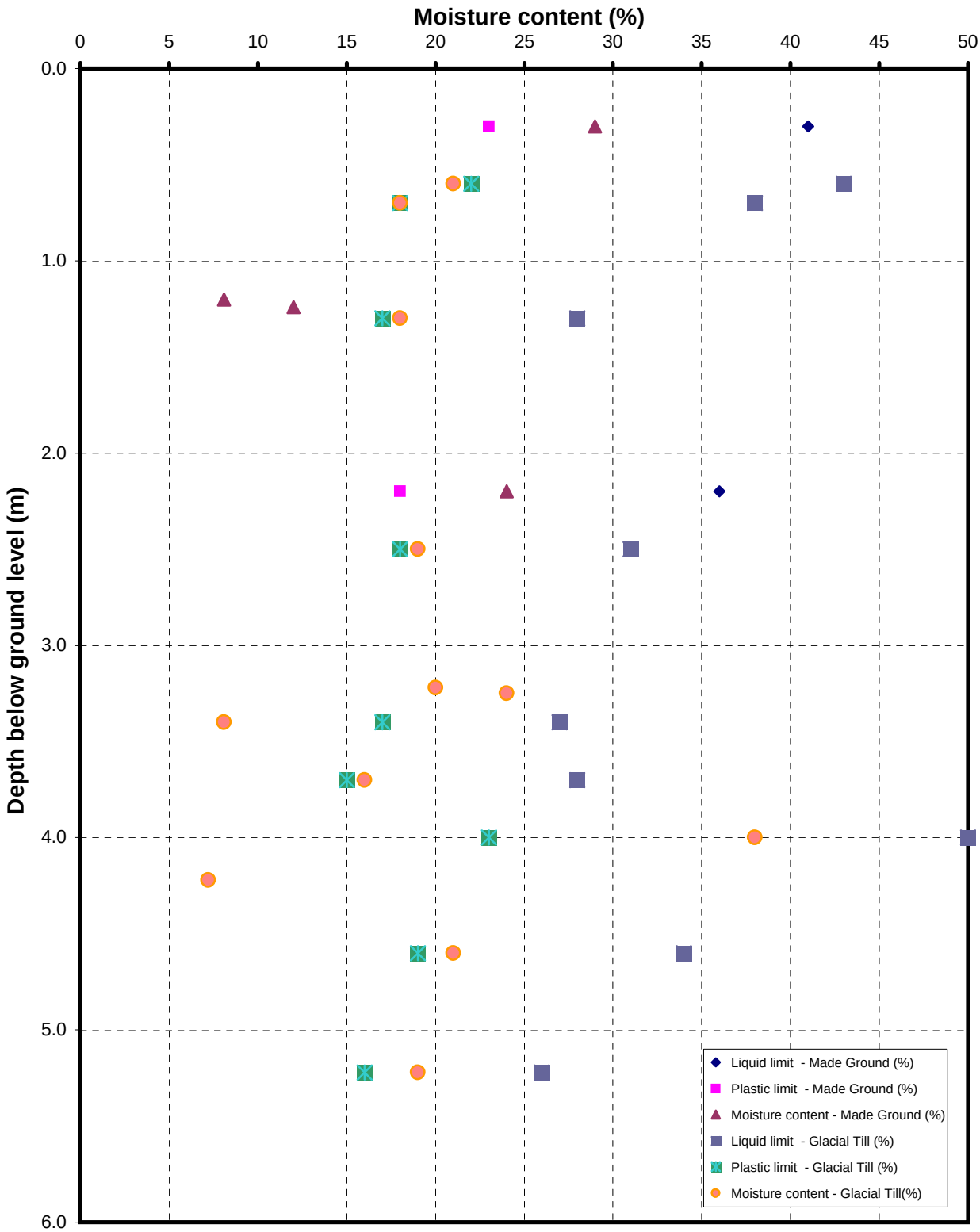
Notes:
In general 'N' values shown as 50 are maximum blow counts not 'N' values. True 'N' value greater than that shown but the high values are almost certainly a consequence of encountering cobbles/ boulders or bedrock and may not representative of the true relative density

Not to scale

Notes Not to scale	**Project** Hirwaun Industrial Estate Project No H8076 Carried out for Enviroparks Limited	**Drawing** 8 Sheet 1 of 1

Plot of Index Properties against Depth

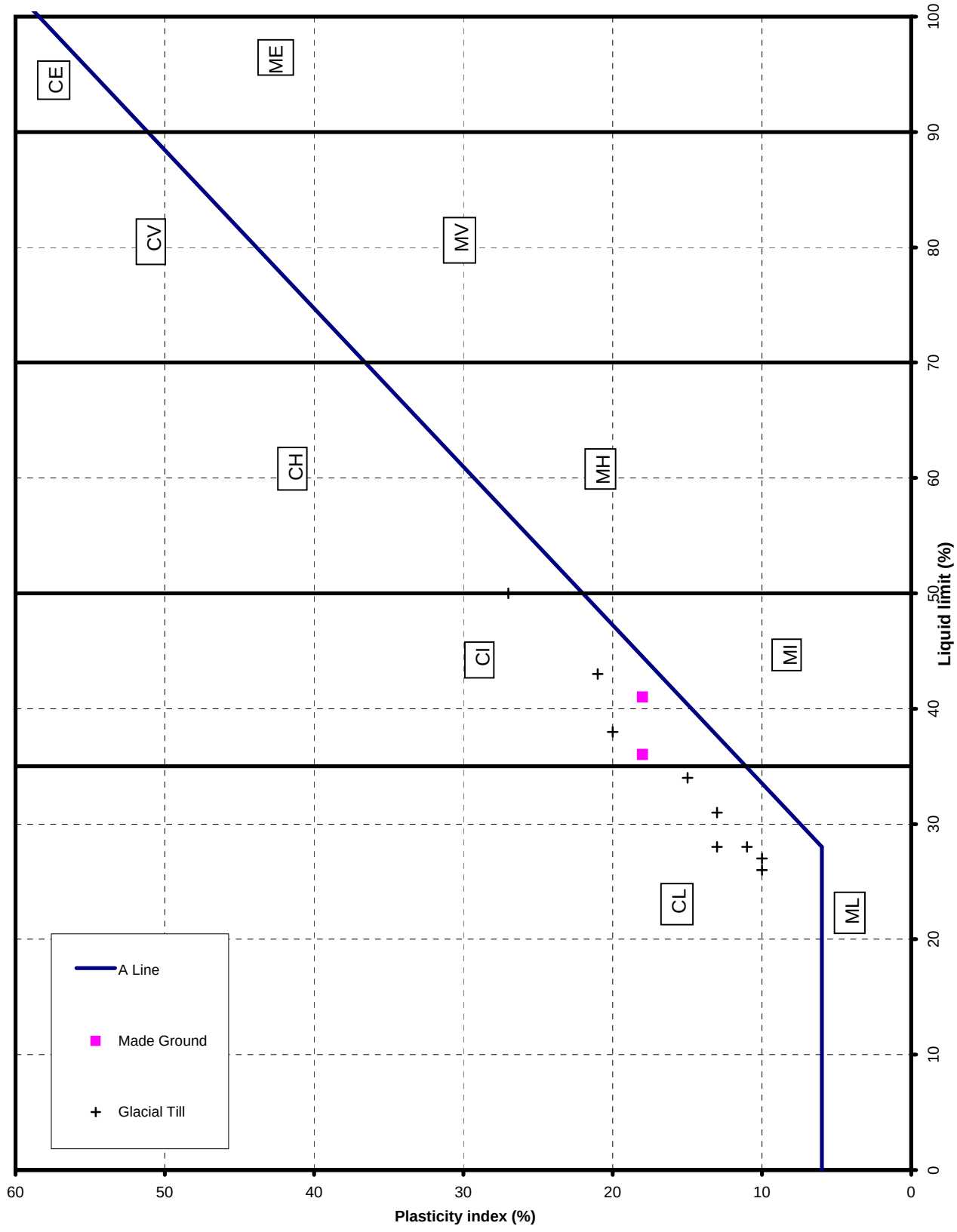
Soil Mechanics



Notes Not to scale	**Project** Hirwaun Industrial Estate Project No H8076 Carried out for Enviroparks Limited	**Drawing** **9** Sheet 1 of 1

Plasticity Chart

Soil Mechanics



Notes Not to scale	**Project** Hirwaun Industrial Estate Project No H8076 Carried out for Enviroparks Limited	**Drawing** **10** Sheet 1 of 1